The Journal
OF THE
Royal United Service Institution.

VOL. XVII. 1873. No. LXXIII.

LECTURE.

Friday, March 14th, 1873.

General Sir JAMES HOPE GRANT, G.C.B., &c., in the Chair.

ORGANIZATION AND EMPLOYMENT OF CAVALRY.

By Colonel VALENTINE BAKER, h.-p., late 10th Royal Hussars.

THE subject which I have the honour to introduce to this meeting to-day, is one which has, during the last few years, attracted the earnest attention of all the military authorities of Europe. Since the introduction of railways and telegraphs, together with improvements in small arms and cannon, great changes have taken place in the tactics of both artillery and infantry, but in neither of these branches has such a complete revolution been effected as has been found imperative in the action of cavalry in the field.

Some may be loth to acknowledge that in actual battle, cavalry do not hold the same position as of old, and may look back with regret to those glorious charges, which in the days of Marlborough, of Frederick the Great, and even in the time of the First Napoleon, so frequently decided the fate of the day. But experience has spoken too strongly and convincingly to leave a shadow of doubt that those splendid opportunities have passed away, and that it is before and after an action, that the main *rôle* of cavalry must lie in the future.

For years past, the real truth was forcing itself forward. In the days of the great wars of Napoleon's era, it was becoming gradually apparent that cavalry could rarely, if ever, act effectively against steady and well-trained infantry.

The introduction first of the percussion-lock and next of arms of precision, made this truth more and more evident, and when breech-loading added rapidity to the accuracy of infantry fire, Officers of experience and weight in all armies were found, who urged that the days of cavalry had passed away, and that this arm in future would only become an encumbrance to an army; and the singularly unimportant part, which the cavalry on both sides had played in the Franco-Austrian War in Italy, seemed almost to justify this conclusion. But far-seeing men of real military genius had already discerned that the action of cavalry in war had changed but not departed. Rising above

petty prejudices and confined views, it had struck them that in the increased rapidity of modern war, early intelligence and information was becoming all important, and that a great and glorious future was already dawning for this arm. Both Austria and Prussia were already acting upon these ideas when the war of 1866 broke out, and although the rapid successes of the Prussian Army rather threw the action of the Austrian Cavalry into the shade, the name of Edelsheim should not be forgotten as a leading and early guide to the new and true action of this arm in coming campaigns.

At the conclusion of that war, so convinced were the Prussians that cavalry used mainly for purposes of intelligence were becoming more and more important, that they made a most considerable increase to this branch of their service.

The war with France gave an insight into what well-instructed cavalry could do when scientifically used. The French had not realised those changes that others had accepted as imperative.

They endeavoured, by devoted gallantry, to maintain the old action and old traditions of their arm, and their cavalry consequently failed on almost every occasion to aid their armies by proper intelligence in the early operations of the war, or to save them from the coming storms when disaster was breaking upon them.

Let us now consider how these lessons of the past may be made useful to us in the future. It becomes the duty of those who have had personal opportunities of watching these great and recent campaigns to ponder seriously over those lessons and to endeavour to apply them for the advantage of their country.

It is this feeling which has induced me to accept the invitation of the Committee, to give a Lecture here to-day, but I trust that in any views I may propound, this meeting will believe that they are advanced with no idea of dogmatizing, but merely as the expression of my own opinions, put forward for the purpose of eliciting that argument and dispassionate consideration, which is ever so useful in the study of military questions.

In considering this subject, I shall mainly refer to possible improvements both in the organization and action of the cavalry of the British Army; and we must never forget that organization ever precedes action, and that theories are useless in war, unless the power exists to give these theories practical application. Here, at the outset, a feeling of discouragement falls upon the British Officer who studies his profession. For however much we may be convinced of the spirit of the British Cavalry Officer, and of the magnificent material that is at our command, we are bound to acknowledge that our regiments are not at present organised for war, and that it would be impossible for them to sustain the stress which war would inevitably throw upon them. A moment's consideration and comparison,—and in war everything is comparative,—will show this to be the case. In all the great continental armies it has been accepted as a military axiom, that cavalry and artillery cannot be improvised, but that a sufficiency of well-trained men for both these arms must be maintained either in the ranks or in reserve, in time of peace; that trained horses are necessary as well as

trained men, and that a sufficiency should always be in the ranks or in immediate reserve, to complete regiments to a war strength and to maintain them effective under the exhausting influences of war.

Thus if we examine the constitution of any foreign cavalry regiment, we shall find that this has not been lost sight of; nearly all have five or six squadrons. They only place four in the field, and the others remain as a reserve to supply their losses, and let us compare the strength at which they would go into the field with that of our own regiments. A North German regiment of cavalry in the field, numbers 691 riding and 16 draught-horses. It has reserves of both horses and men to maintain this strength. But what is the constitution of the British cavalry? We have nine regiments of 384 horses, and ten regiments of 320 horses. They have no reserves of any kind, either in horses or men, and you know that a cavalry soldier takes at least from a year to eighteen months to render him effective in the field.

Thus regiments of this strength would have to go into the field, and maintain themselves in an effective state without any possible means of supply in men, under the exigencies of war and sickness, for a period of a year or eighteen months. But let us only look at the Autumn Manœuvres, and we find that in that short imitation campaign, unaffected by wounds and deaths, and with marvellously few casualties from sickness, the weak regiments were so drained by supplying orderlies and necessary detached parties, that they often only turned out twenty-six files per squadron, and both strong and weak regiments could only put three squadrons into the field.

Imagine what these regiments would have been after a year's hard campaigning, perhaps under unhealthy influences. But we have not even to draw upon our imagination for this picture. I well remember —and I have no doubt there are some in this room who were present— a review of the British cavalry on the Queen's Birthday on the Monastery Heights, in 1855, when the Army was in front of Sebastopol.

The regiments when the war commenced were at a weak strength, and, as at present, they had no reserve of men or horses. The Light Cavalry Brigade then comprised five regiments. Those regiments, if maintained at the strength of North German regiments, would have given a force of 3,455 horses with proper reserves of both men and horses.

These gallant corps had gone through the ordeal of Balaclava, and suffered terrible losses in proportion to their numbers, but so small were those numbers, that this loss, heavy as it was proportionably, only amounted to 387 killed, wounded, and missing. Yet at the review in question, these five regiments could only turn out one squadron—not one squadron each—but actually one squadron, made of Hussars, Light Dragoons, and Lancers amalgamated from the five regiments. This was only ten months after the commencement of the war, and I would ask any Commanding Officer of a weak regiment whether he could hope for a much better result at the end of a year or eighteen months of hard work and sickness unsupported by any reserves.

But the question has not been omitted entirely in the recent reorganization of the Army, and it is, I believe, intended that men should

serve for eight years in the ranks and four in the reserve. But this does not deal with the existing difficulty. It is evident that it will be eight years before this reserve commences, and twelve years before it is fully formed. Even then no reserve of horses will exist, and I will ask any one who has ever commanded a regiment of cavalry, even assuming him to have a sufficiency of reserve men, whether it would be possible, after probably receiving a sudden order for embarcation, to complete his regiment from 320 horses to the war strength of a continental regiment, and to train these horses and render them effective prior to embarcation.

I think that to all cavalry Officers who love their profession, this is a very depressing state of things, for they cannot but feel that their exertions, however energetic or steadfast, would have nothing adequate to work upon in case of war.

But let us trust that this very apparent weakness in our organization will tend to its correction, and let us endeavour to find by every means in our power the most simple method of correcting the evil.

With regard to a proper supply of trained men, this can at present only be accomplished in one way—viz., by maintaining the regiments at a war strength in men until their reserves are created; and as the cavalry soldier without his horse costs but little more than the infantry soldier, it would not require a large augmentation either of numbers or expenditure, to place our cavalry upon an effective footing. I think that the minimum number which should be maintained per regiment should be 750 men, and this amongst our few cavalry regiments would only render a small augmentation of the Army requisite.

It has been urged that the country can never be expected to maintain a war strength of horses in time of peace, and if we had a reserve of horses this argument would be perfectly reasonable. But where is this reserve to come from?

This is a question which is at present occupying much of public attention. In the plan which I am about to propose, I endeavour to deal with the wants of the whole Army, and not only of the cavalry.

This plan is, I have no doubt, open to criticism; but I would ask my critics to remember, that a reserve is absolutely and imperatively necessary.

No one can doubt that the question of a supply of horses for military purposes is becoming daily more important. Modern war, from its rapidity, assumes that an adequate reserve shall be immediately forthcoming, and practical experience tells us that, whatever may be the merits of the present controversy relative to the quantity and quality of horses in this country, they are not to be obtained for the Army with the same facility as of old.

In calculating the reserve which would be sufficient for our probable requirements, two questions arise. Firstly, the supply of horses for defensive, and secondly, the supply of horses for offensive, purposes. It has been assumed, and probably with truth, that, in case of an invasion, a system of requisition would be put in force, and that then both the quantity and quality of the horses in the United Kingdom would prove sufficient for our wants.

But admitting this assumption, it becomes a further question, whether this power, which evidently would not be enforced until a moment of extreme emergency, would leave time for proper selection, distribution, and training.

It must be allowed that, assuming this power to be put in action, a previously known organization would be of advantage both as regards public convenience and private rights.

But if we turn to the offensive action of this country—and it must be admitted that offensive action might become imperative under certain, though perhaps not immediately probable, contingencies—the question of a supply of horses assumes a most serious aspect.

It is scarcely to be supposed that the Government of the country would proceed to enforced requisition for offensive purposes without some previously known and acknowledged liability on the part of horse owners. It is equally certain that an immediate or even rapid supply of the requisite number of horses to place our armies in the field, could not be obtained by any reasonable expenditure of money.

And it must be remembered that, under the conditions of modern war, an Army that cannot be placed in the field, ceases for all practical purposes, to be an Army; and the maintenance of such a force becomes a useless and unnecessary national expenditure.

The recent organization of the regular Army, with its present reserves, would admit of a force of about 100,000 men being placed in the field. It therefore remains to be considered what reserve of horses would be sufficient to complete this force to a war footing, and then to determine how this reserve may be most certainly and conveniently forthcoming.

If this force could not be placed on a war footing, the whole Army of the country would be paralysed either for offence or defence, for it embraces the efficiency of the artillery and cavalry.

These reserves resolve themselves under two heads:—Firstly, horses that must be trained for military purposes. Secondly, ordinary draught-horses.

Under the first head, come the horses to complete the cavalry and the artillery.

Under the second head, engineer train, divisional and corps ammunition columns, and the regimental and ordinary transport.

Let us now first consider the question of a defensive reserve of horses. It is evident that the invasion of this country would never be attempted except with a very large force, and that we should be compelled to meet it with the combined action of regular troops, the militia, and the volunteers. The forces thus employed would probably be most considerable.

It has been assumed that, in war, the direct and indirect supply of horses should be nearly equal to the number of men. But this, under ordinary conditions, where railways are available, becomes an extreme theory.

For this supply in war may be divided under two general heads, viz:—First, the regular horses of the Army, including its organized transport; and secondly, the requisitioned or hired transport, which is

merely used for maintaining the supply of stores and provisions in central or necessary depôts.

As the Prussian regular transport was put to an extreme test during the late war, and as the distinction between the two classes of transport just named was most jealously maintained in that Army under all ordinary circumstances, the number of horses in proportion to the men in a North German Army Corps will give a fair rule for guidance; but it must be remembered that neither tents nor horse-blankets were carried in the waggons, and the carriage of tents and horse-blankets throws the greatest stress upon the transport of an army in first line.

Thus we find that, to a force of 37,507 combatants, 13,802 horses are required, or about 7 to 20.

It is evident that no force, whatever might be its constitution, could be placed in the field, fed, and supplied in face of an enemy, unless at least this number of horses were forthcoming.

Taking for granted that this could only be effected by enforced requisitions, let us now consider whether this extreme measure might not be modified by previous organization, and whether the distribution of the supply thus acquired might not also be much facilitated. To effect this, it is suggested that, in place of the present tax upon horses, an *ad valorem* duty should be imposed; that all horses classed by their owners at a certain value, which would be within the limits of reasonable expenditure for military purposes should be inspected, and that such as were eligible, should be registered. That horses so registered should, by Act of Parliament, be liable to be purchased by the Government at their classed value in case of probable war or invasion. That in consideration for such liability, these horses should be exempted from taxation whilst remaining so registered.

It is evident that this system would provide a sufficient supply of horses for any possible military purposes. It implies no new liability, for it is acknowledged that an enforced requisition would have to be resorted to under such contingencies. It would give the horse owner a previous knowledge of whether his horse was or was not liable to requisition, and in the former case would give him a *quid pro quo* in the shape of exemption from taxation. It would probably rather increase than diminish the amount of revenue derived from this source. If so registered and inspected, these horses might evidently be classed, divided into districts corresponding to the organization of the troops, and arrangements might be made for their immediate purchase and regular distribution in case of necessity.

Let us now consider the question of offensive war, demanding an immediate supply of trained horses, and a more modified supply of ordinary draught-horses.

Into this question another and important consideration also enters.

Autumn Manœuvres have been recognized as a necessary and important part of military training. They demand an annual, but temporary, supply of horses. This supply is at present a source of very heavy expenditure.

It is suggested that both this difficulty and that arising from war might be met through the existing force of Yeomanry.

The Yeomanry force consists of 13,000 horses. The constitution of that force is not at present all that could be desired, and it is most irregularly mounted, comprising many horses of great value, and many that are utterly unfitted for the duties of either cavalry or mounted rifles.

They may be divided into three classes:—Firstly, horses belonging to the better class of farmers, or sporting tradesmen. These are usually excellent. Secondly, horses belonging to small farmers, or the less wealthy farmers' sons. These are often of very indifferent quality, their owners are obliged to maintain horses for purposes of cultivation or for light draught, and they ride them during their military duties. This is the largest class in the Yeomanry. Thirdly, horses hired by men who do not at other times keep them, but join the Yeomanry from ideas of parade and show. This useless class should be got rid of. Its loss would be a gain to the Yeomanry force, and a saving of expenditure to the public service.

It is suggested that the numerous second class might be made available for maintaining a reserve of horses; that, at the same time, the quality of the horses of the Yeomanry would be improved, and that a stimulus might also be given to breeding, through the number of good mares thus thrown into the hands of farmers, for three-fourths of the horses bought for cavalry purposes are mares.

This proposal would be carried out in the following manner:—

Officers commanding cavalry regiments and the Officers buying for the Royal Artillery would be allowed each year to purchase an additional percentage of horses.

These horses would be trained with their respective corps for one year, and the additional percentage so purchased would then be handed over to the Yeomanry, upon the following conditions:—They would keep these horses at their own cost; would ride them when under arms with their regiment; would maintain them in good condition as certified by periodical and reported inspections by the Yeomanry Adjutants.

They would give them up, if required, for five weeks after harvest, for the purposes of Autumn Manœuvres. They would give them up in case of war for regular military purposes, and would, in this case, have them replaced by horses purchased by the Government under the conditions already explained. Farmers belonging to the Yeomanry might be allowed to have an additional reserve artillery draught-horse on the same conditions. On these horses becoming sixteen years old, they would become the property of any man who had kept the same horse for the five previous years. Under other circumstances they would be sold by auction for the Government.

Let us now consider the cost of the proposed plan. In case of war, a reserve of 4,500 horses for the artillery and 2,500 horses for the cavalry would be required = 7,000.

Including probable casualties, this would require an additional annual purchase of 1,000 horses at four years old, say 400 at 40*l.* = 16,000*l.*, and 600 at 45*l.* = 27,000*l.* To this must be added the cost of keeping 1,000 horses for one year at 28*l.* per horse = 28,000*l.*, or a total cost

of 71,000*l*. But the loss on the 2,000 horses for the Autumn Manœuvres of 1872 was about 40,000*l*., and as this loss would be avoided by the system proposed, the actual cost would be about 31,000*l*. The increase from the system of taxation advocated, would probably far exceed this sum.

These horses would be thoroughly trained, used yearly, and would be ready at a moment's notice in case of war.

There is a minor point which is yet worthy of consideration. These horses would have to be trained by the cavalry and artillery. This would throw a greater stress in the way of breaking, upon these services, and it would be only fair that they should reap some reward. It is suggested that, of the whole number of horses required for those two services, they should be allowed to select 50 per cent. The remainder would be awarded by lot to the regulars and Yeomanry. This would give a reward for training, and would, at the same time, guard against careless purchases.

I may state that, from careful inquiries which I have made, there would be very little doubt that the number of horses proposed would be applied for on the terms specified, and if made voluntary, the system would be most popular with the Yeomanry.

Thus, probably at a reduction of actual cost, an efficient reserve of horses might be immediately forthcoming.

It is evidently impossible that the Yeomanry, as at present constituted, can act as a reserve in men for the regular cavalry in time of war; but, it appears to me, that they might thus act as a reserve for horses, and that, if two Yeomanry regiments were linked to every regiment of the regular cavalry, as has been arranged in the connection between the militia and the infantry, I have no doubt that the system I have proposed could be carried out, to the satisfaction of both Yeomanry and regular cavalry.

Before leaving this subject I will touch upon a point which, although thoroughly understood by cavalry officers, is not, I think, generally appreciated by the Army at large; I allude to the proportion of dismounted men considered requisite to keep a cavalry regiment effective in the field. I have often been asked by Officers of great intelligence why this should be the case, and it has been pointed out that in continental regiments it is not the case to the same extent as with ours. But that, I think, is a mistake. English regiments in time of war have to furnish duties which are provided for in time of peace by continental armies. Thus, if we take the staff of a cavalry brigade at the outbreak of a war, we shall find that this staff is furnished by the men of the cavalry regiments composing it. That is not the case with continental armies. A regular staff is maintained, and therefore in time of war, regiments, are not drawn upon to the extent that ours are, and therefore the same proportion of dismounted men is not required.

A little illustration will prove the absolute and imperative necessity, and also the economy of maintaining a certain proportion of dismounted men in time of war. I will take the case of a cavalry regiment on service having no dismounted men. Let us assume that a man and his horse both go sick upon the same day. Trace the result. The man goes into

hospital, but the horse is sick and must be left behind. Another man must be left to take charge of it, and that man remains behind. But that man leaves his horse again, and another man must be detailed to lead this horse. Therefore because one man and one horse go sick, three men and three horses are rendered non-effective. Let us assume the existence of one dismounted man. The one dismounted man would take charge of the sick horse, and the loss to the ranks would be one man and one horse. There would be no further loss; whereas in the other case there would be a loss of three men and three horses. I think this illustration, although a small one, and one which may be considered rather exaggerated, gives a fair idea of the absolute necessity for having dismounted men in the field.

I have now noticed our system of organization, with regard to the supply of men and horses; but, whilst dealing with organization, there is another point, of so much importance, that I must not pass it by.

Assuming that our supply of men and horses will some day be made effective, how are we to clothe, arm, and equip them?

I think it will not be difficult to prove, as I shall attempt hereafter, that the work demanded of modern cavalry will be greatly in excess of that of past days. We all know, from practical experience, the fatal influence of excessive weight upon horses, and it evidently behoves us, in time of peace, to endeavour to diminish that weight as much as is possible, without interfering with the efficiency of the soldier.

My time is too limited to go much into detail upon these points; I shall, therefore, touch them briefly. Firstly, with regard to clothing, I think I shall express the opinion of the great majority of cavalry Officers when I say that, what we want is a handsome attractive uniform for purposes of parade, and another useful serviceable uniform for purposes of real hard work.

This has recently been recognized in the infantry, let us hope that it will be extended to the cavalry.

There is another point that I must here notice, as affecting heavy cavalry, viz., the use, or disuse, of the cuirass. Now, the evidence afforded by the late war, upon this point, is too strong to be ignored. It was remarked, by everyone who was present on those battle-fields, that cuirasses were rarely, if ever, found pierced with bullets; but the continental cuirass is different from ours. Years ago, our cuirasses also would turn bullets, but we have now so lightened them, that they are practically useless for this object. I should recommend that a really useful cuirass should be introduced, and that its use should be extended to all of our four heavy cavalry regiments.

Now, with regard to arms, I think that the independent action likely to be accorded to cavalry, certainly demands that both a sword and a carbine should be carried. The first weapon is capable of much improvement and should, I think, be issued in sizes. In the Henry-Martini carbine we shall have a beautiful arm, having the advantage of easy loading and long range. The latter, I consider a most important point for cavalry, as the instances must be very few where they could, or should, use their carbines at short ranges. But it appears to me that the Lancer—and I am an old Lancer myself—is thoroughly

over-armed. Notwithstanding assertions made by American Officers, I believe that a pistol is a demoralizing and dangerous weapon for a cavalry soldier. Moreover, as at present armed, a Lancer is not well qualified for outpost or scouting duties. I would suggest that he should be armed with only a lance and a carbine. The lance is a splendid weapon, if well used. Teach him to rely upon it utterly and implicitly. Moreover, if armed with a carbine, the Lancer would be exceedingly serviceable for any temporary dismounted duties, as he could leave his lance slung upon his horse.

We will now turn to the more important point of the horse equipments, and, although I am warned that I have much important ground to traverse in a limited time, I cannot refrain from making a few remarks upon this subject, for it is one upon which I believe many popular fallacies exist. Certainly, nothing can be more important to cavalry than the well fitting and practical efficiency of their saddlery.

But for some years past it has been the fashion to depreciate our own knowledge with regard to saddlery, and to imagine that on this point they were far ahead of us on the Continent. Common sense will tell us that this ought not to be the case, and experience of continental armies confirms common sense.

Some twenty years ago, it was the fashion to copy everything relative to our cavalry from the Continent. We—a nation with the greatest experience in everything relating to the horse—had no confidence in our own judgment when it had to be applied to cavalry.

But a step was at last made in advance; our cavalry seat was made more English, and an immense improvement in the riding of the men was the consequence, whilst at the same time sore backs—that curse of cavalry—became more rare.

Rely upon it, with all its defects—for it is defective,—the British cavalry saddle is one of the best in Europe, and when you hear of continental cavalry making unprecedented marches without sore backs, do not believe it. Those who make those reports, sincerely believe what they say, but they do not see the rear of the army they are working with. During the late war, I had heard these astounding reports of Prussian marches and the perfection of Prussian saddles.

The year before, I had ridden for many days in a Prussian troop-saddle, and had failed to detect its advantages.

But sleeping one evening during the war in a town about 20 miles in rear of the army, I came upon upwards of 30 horses with some of the worst sore backs I ever saw, belonging to a regiment which is notoriously one of the most effective in the Prussian army.

There are three ways of diminishing sore backs on active service:—

Firstly—by having a good saddle;

Secondly—by diminishing the weight in the saddle; and

Thirdly—by constant and careful attention to details of fitting; and the latter is the most important of all.

I am glad to say that the Saddlers' Company have offered no less than ten prizes, the highest prize being 50*l.* for the best military saddle. Before doing so, they placed themselves in communication with the military authorities, and the latter, fully appreciating the absolute

necessity of lightening the kit, have laid down conditions which should be of great practical use in providing us with a model saddle in the future. I believe that any one may compete for these prizes, and cavalry Officers could not do greater service than by thus bringing their experience to bear.

Let us now consider how the kit can be lightened, and I will ask if anything can look more unpractical for hard work, than a cavalry soldier in marching order. He is over-burthened with things that he does not want on service, and his saddle has to be made unnecessarily strong and heavy to carry this useless weight. The man is taught in riding to keep his hands low, but the height of the kit in front, makes this an impossibility.

Saddles are fitted when horses are fat, and they do not fit when the horses grow thin. How can all this be avoided?

I would suggest the following plan:—

The valise on service should be done away with. The cloak should be rolled behind; and the man should not carry with him more articles than can be carried in the wallets. By carefully working out this system and lightening the saddle, which then becomes possible, we may take two stone off the weight of our cavalry, and we all know the immense difference this reduction would make in long marches.

I think that the substitution of leather numnahs for the felt ones now in use, would be an advantage, and the girth should be of web or plaited hide, which would save girth galls.

I regret that my time will not allow me to go more into detail upon these points, for they merit the most careful attention.

I feel that in a lecture of this nature I cannot pass over the subject of cavalry castrametation, and picketing.

The rules now extant as to the former appear to be useful and sufficient.

With regard to picketing, I think we ought to disabuse our minds of a great bugbear. When horses first go into the field after being in the stables they are unusually fresh and liable to break away from their lines. They then require special security. But when they have been in the field for a short time, they become perfectly quiet, and picketing becomes very simple.

The present method certainly provides for the first contingency, and is most useful in standing camps, but it is too cumbrous for use in presence of an enemy. Each man now carries a head and heel rope and one peg. The addition of another peg would make him perfectly independent of this cumbrous picketing gear, which might be carried in second line for standing camps.

And here another great question arises. Can tents be carried in first line by the cavalry of an army when in near contact with an enemy? I think not, but will state my reasons more at length hereafter, when discussing this as a question of tactics.

Having now discussed the main point of cavalry organization, let us consider the drill of the cavalry, and the question of what transport is necessary in the field to maintain a state of efficiency.

It is not my intention to open the question of pivot or non-pivot

drill, or to enter upon small details; let us consider this question of drill upon a broad basis; and one point is evident, viz.:—that we require more simplicity and, if possible, more accuracy and rapidity in the movement of large bodies.

At the present time we are hampered by restrictions which have disappeared from our infantry drill and from that of the cavalry and infantry of nearly all continental armies.

Our drill should more decidedly have the movements of war for its object.

It is all very well to say that fancy movements show the state of drill of a regiment and the quickness of Officers. This may have been very well in days gone by, but both the cavalry Officer and the cavalry soldier have now so much to learn that is absolutely necessary for the proper performance of their duties, that the time devoted to fancy drill, not applicable to war, must be time mis-spent.

Outpost and scouting duties, upon which in the future, the main value of cavalry will rest, demand constant practice and constant instruction. Yet, as was most justly remarked by a distinguished cavalry Officer in this room some weeks ago:—What opportunities have we for imparting this instruction? Few, I imagine, know the difficulties under which Commanding Officers of cavalry labour in this respect.

For instance, any one acquainted with the Brighton Downs, and also knowing that the head-quarters of a cavalry regiment was stationed there, would naturally suppose that great facilities existed for instruction in out-post duties. But on enquiring, they would learn that this beautiful country for cavalry is debarred from use, and that even a proper drill ground does not exist. It is the same almost everywhere. In the course of more than thirteen years of command both in England and Ireland, I can safely affirm that with the exception of Aldershot and the Curragh, no cavalry quarter that I have ever been stationed at, has afforded any fair opportunity for proper instruction. How easily might this be corrected by Act of Parliament, allowing this practice at certain seasons and paying a small compensation for damage.

Surely if it is worth while to spend so many millions upon our Army, these few hundreds need not be grudged when a question of efficiency is involved.

But this is not the only difficulty which presses upon a Commanding Officer of cavalry.

Every one must allow that the duties now thrown upon the cavalry soldier demand very much increased intelligence, and not only intelligence, but a knowledge of the operations of war.

It struck me many years ago, that this might easily be imparted to intelligent non-commissioned Officers and privates. Aided by a succession of active and intelligent Adjutants, I instituted classes where they received instruction in field sketching, reports on roads, and the whole theory of outposts, &c.

The men most thoroughly supported these efforts and many really attained remarkable proficiency. Their knowledge was also more or

less imparted to their comrades, and I soon discovered that a mine of zeal existed that only wanted working to become most valuable. But this instruction, even on a limited scale, entailed very considerable expense, and this expense was not borne by the public. I only mention this to show the many difficulties which beset a Commanding Officer of cavalry in carrying out a system of instruction that would really develop all the valuable qualities of both our Officers and men.

After leaving the question of drill, there is one point I feel I may here touch upon, and it is that of flag-signalling. Flag signals up to the present moment have not, I think, received the encouragement that they deserve. It is quite certain that we cannot trust to them entirely, but they are a most useful adjunct to an army in the field, and especially to light cavalry in advance. The system upon which flag signals have hitherto been worked at our Autumn Manœuvres is that they have been attached to the head-quarters of the army, and from the head-quarters a connection by means of signalling parties has been maintained to the front, where certain signalling parties have been placed. That system, I think, is a failure. Signallers should, it appears to me, be attached to the brigadier of the cavalry brigade which is covering the advance of the army. It must always happen that if attached to the head-quarters of the army they send back to the General in command, signals which do not correspond with the reports furnished by the Officer commanding the cavalry brigade. It is the part of the Officer commanding the cavalry brigade to sift the many reports which come to him from the outposts or from scouting Officers. He does not send each of these individual reports back to head-quarters; he carefully examines them, and, having examined the reports which come in from all parts, he is generally enabled to form a very accurate idea of the movements of the enemy. Let us imagine a case which might very easily happen. We will assume that the Officer commanding a cavalry brigade is covering the front of an army. From the reports which he receives from his different scouting Officers it is evident to him that the enemy to his front are massing on his left, probably with the intention of making an attack. On the right there happens to be a signalling Officer in connection with the head-quarters of the army. That Officer sees troops perhaps arriving from some distant point, and not likely to come into action that day. He sees these troops arriving on the right of his army, and immediately signals back to the General at head-quarters, "Enemy advancing in force upon our right." A few minutes afterwards the General Officer commanding the brigade, who knows of the advance of this division on his right, but knows perhaps that it has come from a great distance, and that its action will not be important that day, sends back a signal to the General Officer at head-quarters saying, "The enemy is advancing in strong force on my left; reinforce "me with infantry," I ask you what is the position of the General at head-quarters under those circumstances? He has two distinctly conflicting reports. It is possible he might say, "I must attach the "greatest importance to the report from the Officer commanding the "cavalry brigade," but at all events it would lead to indecision, and possibly to the reinforcements not being sent to the point expected by

the General Officer commanding the cavalry brigade, and might give rise to one of those difficulties which so constantly occur, and which are so important in war.

Before leaving this question, I will also touch upon a point which is attracting considerable attention. I allude to the question of Mounted Rifles. This is not by any means a new question; it is very, very old. The old dragoon was intended to be a mounted rifleman, that is to say, he was intended to be a cavalry soldier able to act either on foot or on horseback. During the American war, when cavalry had to be improvised, the whole of the American cavalry, on both sides, were organized upon the principle of the old dragoon, that is to say, they fought either mounted or dismounted. In the controversy which has taken place upon this point, I noticed a letter in the leading journal, from an Officer who served with the American armies. He called attention to the value of the American cavalry, as so organized. He called attention to the large numbers so employed, and he ended by saying that these American cavalry were, perhaps, of higher value than any cavalry that had ever been formed, belonging to any other army. Now, we can all look back to the American campaign, and, in looking back, what do we remember? We remember a series of battles, that were decided by the infantry on one side or the other, but which had no results, for they were never followed up. I ask, is it reasonable to suppose that, if cavalry existed which was superior to any cavalry that has ever been organized by any army, this, time after time, could have been the case? I think it is a manifest absurdity. Every Officer who has commanded any force of cavalry in the field, especially recently, must have felt the absolute want of mounted infantry—mounted infantry, not in large numbers, but in small numbers, attached to cavalry brigades. But I think, in considering this question, a distinct line should here be drawn. It is not mounted rifles that we want, to act as cavalry or infantry, but it is a small force of mounted infantry, to be attached to cavalry brigades; and we must remember that this force will be a most expensive one, because we find that, practically, when we use cavalry dismounted, we are only able to use one half, or the other half becomes immobile, that is to say, their horses cannot be moved in the absence of these men. Thus it would seem that we shall only be able to bring into actual use, one half of the force of mounted infantry that we maintain. That being the case, I think they should be men very highly trained, because it is an expensive force, and can only be kept up in very moderate proportions.

Before leaving the subject, which has been very ably touched upon by Colonel Wood in a recent lecture, I must say there is one point in which I disagree with what I think was his meaning. He spoke of carrying a proportion of these mounted riflemen upon cars, and proposed, as I understand, to use these men with the mounted men in advance of an army. This, I think, would be very dangerous. It is a most important point not to keep in front of an army, any carriages of any description that are not absolutely requisite. Nothing can be more important before an action than that all the roads which lead to the front should be kept perfectly clear for the infantry that are

coming up. We have only to assume a shot striking some of these cars, the men could never get to the rear again, they would have to be left in the hands of the enemy; and it is very easy to assume, when these cars were driven back, that they would fall back occupying important roads, which ought certainly to be left clear to the troops coming up.

Let us now pass to the consideration of the amount of transport which is necessary to maintain a cavalry regiment effective in the field as an integral part of that regiment. I say an integral part, for I am quite sure that this meeting will support me in advocating regimental, as opposed to general transport. But when we consider the organization and amount of transport, some very large questions arise. Officers are generally too apt to ignore these large military questions, and to look upon the amount of transport as it affects the convenience and well-being of their own particular regiment.

I think I can soon prove to them that this is a mistake, and that we are all bound to exercise the greatest economy, and to make the greatest sacrifices in this respect.

When armies are not likely to come into contact with an enemy, the amount of transport within ordinary limits is not of any material importance, for armies, under these circumstances, usually occupy a very considerable front, and move by very many different roads. But when these armies are likely to come into contact, a totally different state of things prevails. The front is diminished, and the few roads by which the army can march, are blocked with long columns of troops. Let those whose experience is limited by the Autumn Manœuvres remember the length of the transport column of even one brigade of cavalry, and let them picture to themselves a transport train organized upon that scale, with possibly even a whole *corps d'armée* marching upon one road. Under such circumstances, the transport would be perfectly useless, for the depth of the column alone would prevent its ever coming up at the end of the day.

Moreover, the cavalry would usually be acting in front of the army prior to contact.

If immediately followed by heavy transport trains, imagine how the roads would be blocked for the main body of the army coming up, perhaps, when it was most important that its movements should be free and unimpeded. It will, therefore, be evident that, when advancing to meet an enemy, Spartan simplicity must prevail, and the use of tents becomes impossible.

It is constantly even impossible to feed an army, by means of transport, just prior to contact, unless it is actually in line of battle, and it should be an absolute rule that, under these circumstances, men should carry at least two days' rations with them, and horses one day's forage.

Nothing should be more severely punished than the act of men consuming their rations before the proper day. Rations, under these circumstances, should be inspected as carefully as ammunition, for they are still more important.

But, even when regimental transport must be kept to the rear, it is advisable that one day's supply of corn should follow each cavalry

brigade. Two waggons will carry a supply of oats for one day's consumption of a regiment. This is better than overloading horses with corn, but those having care of the waggons must be charged to clear the roads, at any cost, in case of artillery or infantry coming up and requiring them.

Before leaving this question, I will turn to one nearly akin to it, and which should be carefully considered by the cavalry Officer; I allude to the supply of water on service. The efficiency of cavalry horses depends, to a great degree, upon their being properly watered. They should always be watered twice a day. In selecting cavalry camps or bivouacs, they should, if possible, be placed close to the water. Staff Officers, unacquainted with cavalry, are too apt to ignore this; they imagine that two miles from a watering place is a comparatively unimportant distance. They forget that this entails each horse travelling eight unnecessary miles in the day, in addition to his other work.

I will now turn to the general tactical action of cavalry during a campaign.

I propose to deal with this question by imagining the operations of an army in the field, and tracing the possible and probable action of the cavalry attached to, and accompanying that army.

It will be sufficient for our purpose to-day, to limit this force to one *corps d'armée*. Here, at starting, a tactical question of some importance arises.

Assuming that the proportion of cavalry to a *corps d'armée* would be six regiments, how should these regiments be distributed? By the old Prussian system a regiment was attached to each infantry division of twelve battalions, and the remaining four regiments worked in two brigades of two regiments each. But during the late war, it was found that these regiments attached to divisions had little or nothing to do, and that when a large force of cavalry was required in the front, an unnecessary portion was thus frittered away; and it is now generally considered in the Prussian Army, that although a certain force of cavalry should distinctly be attached to each division, a regiment is an unnecessarily large force for this purpose.

I believe the Prussians have now decided upon attaching a wing of a cavalry regiment to each division, which will give one cavalry regiment attached to a *corps d'armée*. The wing so attached, of course becomes distinctly under the orders of the Generals commanding divisions.

But although, I thoroughly coincide in this view, and this for reasons which I shall state and try to prove hereafter, I shall assume that the organization of our force will be that of three divisions of infantry of seven battalions, each having a cavalry regiment attached, and that a brigade of cavalry and horse battery will remain distinct.

Now let us first trace the usual action of armies on a declaration of war. Firstly, the line of operations has to be determined upon. Then the two opposing armies are assembled at a very considerable distance from each other. Up to this time intelligence is derived from spies. A little previous organization and good pay makes it easy to obtain general information as to the line of operations selected.

But already the action of cavalry has commenced. Far in front of the assembling armies a screen, thin and weak perchance, but still a screen must be immediately drawn.

It is impossible that this can be done by infantry, although small infantry posts in support are sometimes important. It may be that a hundred miles of frontier has to be so watched.

And here, at the outset, we come to the distinction between outpost duties as ordinarily understood by us, and laid down in the regulations, and the scouting duties I am now alluding to.

For it is evident, that to maintain a line of 100 miles upon the ordinary system of outposts, would require an immense force of cavalry, whereas a screen of scouts might be formed from a very moderate force.

It will be well at once to draw what I conceive to be the real distinction between the two.

Cavalry outposts proper, are usually placed when armies are in close contact.

Scouts, on the contrary, generally act far in advance of the armies to which they belong, or on an enemy's flanks, or for special purposes when armies are nearly in contact. Outposts are maintained for protection from surprise. Scouts are used for gaining information.

It follows necessarily that scouts should be selected for extreme intelligence.

The value of good information is so important, and the evil of bad information so great, that it would never be safe to trust to any body of ordinarily-trained men to fulfil these duties. Having been previously specially trained, they should be specially selected from each regiment and placed under an Officer, remarkable for his energy, quickness, coolness, and decision: a first-rate Officer of scouts—a man whose information can always be relied upon,—is invaluable to an army. Never did knights of old unite cool courage, daring intrepidity, and fine horsemanship in a greater degree than must be combined in him. And to these qualities he must add a thorough knowledge of the organization of armies and a practical acquaintance with the operations of war. His men will quickly recognize these qualities, if they exist and will work up to him as a good pack of hounds will work under a good huntsman.

It remains to be considered what number of scouts per mile will usually be sufficient for an army under ordinary conditions of country. I think that ten scouts per mile would be a maximum number and five a minimum. And here let me confess that I intend to advocate a novel theory in the action of cavalry. I may be right or I may be wrong, and I invite full discussion on the point. I believe that we and most countries are in the habit of frittering away our cavalry in unnecessary small bodies, which can never be brought together in time to oppose a determined reconnaissance on the part of an active enemy, and in place of this system, I would advocate a thin line of intelligent scouts aided by signalling parties, this thin line being supported some distance to their rear by bodies of cavalry massed in considerable numbers, say a brigade with its guns.

When armies are not in near contact, I believe this system to be immeasurably more effective than having chains of vedettes with picquets and supports, and it saves both men and horses.

But let us now start with our *corps d'armée* at the commencement of its operations. At about forty or fifty miles, or two days' march, in front of this main body the line of scouts will have been established. This line, selected from each regiment in the brigade, will perhaps occupy an extent of front of from ten to twelve miles.*

It is advisable that an intelligent Officer of scouts should be posted to every three or four miles. To every five or six miles, a supporting squadron should be placed some five or six miles to the rear of the line of scouts. These squadrons should keep up a communication with each other by patrols. About ten miles to the rear of these squadrons, and in a central position, the brigade should be massed, and in telegraphic communication with its corps.

Between the brigade and the squadrons, orderly posts will be established; and here, at the outset, we see the disadvantage of having so much cavalry attached to the divisions; for now, when cavalry are so much wanted in the front, three regiments would be with the *corps d'armée* doing nothing. It would probably happen that they would be sent for in support of the cavalry brigade; but, if so, could we be sure that they would come up in time, or afterwards rejoin their divisions at the proper moment, and would there not be a clashing of commands? It is scarcely needful to say that this line of scouts, the supporting squadrons, and the cavalry brigade would all be in advance of any line that it was considered necessary should be held by the *gros* of the *corps d'armée*, in order that time may be given to it to advance and take up its line of battle before an enemy could possibly arrive there.

The value of this system, I conceive, would be great. I should urge that where it is possible, for it will not be always possible, the cavalry of an army should be pushed very far to the front, and that the scouts should be pushed very far in front of the cavalry, and the reason is as follows. If the enemy attempt to drive in your line of scouts at any point, they have to advance a very considerable distance before they meet with your brigade or your mass of cavalry. In the first place they would arrive more or less exhausted, and in the next place you would have had information of the point and direction of their attack, and it would give you time to make such arrangements for meeting them as were requisite. This, I think, is a point which we might all study. I only urge it as a theory, and it will be for the meeting to discuss it as they think right, and to give it its proper value.

Next in order, I think, we must consider the moral effect that would be produced if we only allowed one brigade of three regiments to act in front of our *corps d'armée*. We all know that moral effect is of the greatest possible value in war. It is especially of value at the commencement of a campaign, because troops are more or less acted upon in *morale* by the first affair of any scale between tolerably even parties

* It is of course supposed that this *corps de d'armée* is supported by others on its right and left.

of the contending armies. Supposing that we maintain the system of a distinct cavalry brigade of three regiments acting to the front, leaving three regiments attached to the divisions of the corps, it is quite evident we shall only have three regiments available in front. Assuming the organization of the Prussian *corps d'armée* they would have but one regiment attached to the infantry, and they would bring five regiments to the front. I think that this would place us at a very considerable disadvantage, and it is a point that is worthy of thought and discussion.

I shall now turn to the question of cavalry attack, and in doing so I shall first touch upon the attack of cavalry upon cavalry. We all know that it is our custom, and for purposes of drill it is very useful, to manœuvre cavalry in large masses and very long lines; but those who have had experience in war will, I think, bear me out when I say the opportunities for using these long lines, very rarely occur. I have asked a great many Officers who were engaged both in the Austro-Prussian, and in the late wars, and I myself had some opportunities of seeing them in action in the late war, and I must say I never saw cavalry used with a very large front. The front of a regiment is usually about the extreme. But we have to make general arrangements for the attack of cavalry upon cavalry, and it is upon those arrangements we shall now touch.

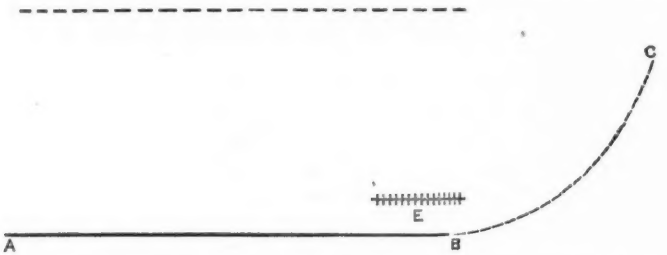
There are three general ways of using cavalry against cavalry. Firstly, the attack in open column; that is to say, the attack of a body with another body immediately in support, and another body immediately in rear, in reserve. This has very generally to be used, but I think everybody will see that it is open to the objection that if the leading force is driven back, it is very apt to disorganise the forces coming up; therefore I think all cavalry Officers will bear me out that it is not a convenient or good mode of formation if it can be avoided. Next, we have the attack in echelon, and this, for all practical purposes, is most generally useful. It may be either in echelon from the right or left, or echelon from the centre. The mode of attack I should usually advocate would be echelon from the centre. There is another mode of attack which is certainly most useful if intelligently carried out: it is the attack by means of oblique formations on either flank. This demands considerable intelligence on the part of the Officers commanding regiments or squadrons, but it may be most effective.

We now come to the attack of cavalry upon artillery. It must be acknowledged that, with the great power the guns now possess and the destructive effect of shrapnel, cavalry must not show themselves in bodies, more than is absolutely necessary, within range of the guns. But it may constantly happen that it is necessary for cavalry to attack, and if possible, to drive in batteries of artillery, for if cavalry can only make a battery limber-up for a time, they may do inestimable service. I should propose that one troop of cavalry should be extended in skirmishing order, supported by another squadron with open files, and that they should advance rapidly upon the guns. They thereby place the guns in this position:—we know it is a special rule with artillery that they do not, except under special circumstances, fire at skirmishers,

and they would not know what to be at. I think that this leading line of skirmishers should be taught, when getting near to the artillery, to close rapidly upon the battery, and to endeavour to shoot the horses. The artillery would be probably supported, but, if their supports advanced, they would be met by the sudden closing-in of the open files in support of the skirmishers. I have tried this system and it appears, as far as one can judge in peace, to work very well, and artillery Officers have told me they thought, in all probability, it would compel their batteries to limber-up for a time.

I shall now come to the action of cavalry against infantry. I think we must assume that cavalry will not be able to act successfully in the future against steady infantry in thorough formation. But there are opportunities when cavalry may be useful; and what I should hope to see introduced would be, that there should be a squadron attached to every seven battalions, and one squadron to the head-quarters of the corps; that these squadrons should lie hidden at about every half mile. It will constantly happen that, when the infantry advance, one side or the other will generally give way. If we suppose that our own infantry give way, a cavalry squadron that can be launched upon the enemy's infantry may often be most valuable, and all those who have seen war know, how very often a momentary success becomes important. Troops retire more quickly than is expected, the enemy encouraged, follow more quickly than would be anticipated, and a gap is suddenly made in the line of battle. I think, therefore, that cavalry squadrons, detached at intervals, will be most valuable.

We now come to the action of cavalry in general line of battle. I think that the action of the *gros* of the cavalry will usually be upon the flanks of an army, but the attack of armies in the future must, I conceive, consist either in turning a flank or piercing a centre,—I think, in a greater or lesser degree, it will resolve itself into that. Assume an army turning a flank. Consider that this diagram from A to B is a



general line of battle, and assume that this army has determined to turn the enemy's left flank. Under modern conditions we know the great power of the defensive, it will therefore probably leave a very weak force to maintain the line from A to B, and it will move round the enemy's flank, concealed, if possible, in the direction of C. If it does so it is evident it will probably mass the majority of its guns upon the

point E, because if the guns are upon that point, the moment the movement is made, the enemy must necessarily throw back his flank to meet it, and if he throws back his flank to meet it the guns enfilade the whole of his new line. It will be neces y that a great part of the cavalry force shall be upon this flank, be ause we must suppose that the enemy's cavalry will be upon his flanks, and that all armies will throw out a line of posts to prevent any such turning movements being made by surprise. It is evident the cavalry will first of all have to drive in these scouts or cavalry parties, and so enable the infantry to move up to the flank and to make their attack. With regard to piercing the centre, I think the action of cavalry would also be upon the flanks. I have been compelled very much to compress these latter remarks, and I fear they will not in consequence be very clear.

But the clock warns me that my allotted time has drawn to a close. I fear I have touched very cursorily and imperfectly upon this most important subject, but, before concluding, I trust I shall be forgiven if I urge upon all young cavalry Officers the absolute necessity of their appreciating the responsibilities of their profession.

I have endeavoured to show that so far from this arm losing its importance in war, its value is daily increasing.

But that value must depend upon the energy and the knowledge of military operations to be found amongst its Officers.

Accept then, I say, the altered *rôle* which is imposed upon our arm. Shall we regret a change that so clearly brings out all the fine manly qualities of the early training of the British youth? Shall we regret a change that gives such scope to individual intelligence and daring?

No, let it ever be our earnest duty to develop all the advantages that have been accorded to us, and to render the cavalry of England fully fitted for the work that may some day devolve upon it.

The CHAIRMAN: Gentlemen, having heard this excellent lecture of Colonel Baker's, several here may wish to offer remarks upon it, and I will, with your permission, say a few words. Colonel Baker has advanced a great many admirable theories, which it is not very easy without due consideration to answer; but there are one or two points which I should wish to remark upon. One is with regard to the difficulty of procuring horses. It appears to me, from what I have heard, that the number of horses in Great Britain and Ireland at present, is greatly in excess of what it was some twenty years ago, and that, therefore, no difficulty should be found in fully supplying the Army. Want of money is the great drawback. The cost of horses has so greatly increased that in order to procure horses, Government will be obliged to pay an increased amount for them.

In India, you are aware, they have studs at different parts of the country where they breed horses for the cavalry and artillery. These studs have no doubt been found expensive; but seeing the great and increasing prices horses are fetching, it might be advantageous to establish them in this country. The price a horse costs Government, at four or five years of age, is, I understand, £65, and this cost will, I fear, increase. But at the same time, if Government will pay a high price, as many horses as the Army can require, may easily be obtained.

Then with regard to "mounted riflemen," I heard Colonel Wood's lecture* the other day, and though I admired much of it, there were some points with which I did not agree. I concur in Colonel Baker's remarks regarding carts for this force. I think it

* "Mounted Riflemen," by Lieut.-Col. Wood, V.C., a Lecture delivered at the Institution to Officers of Volunteer Corps.

would be very injurious to the service if any such conveyances were used. Such a scheme would be utterly impracticable. Now-a-days wars are of such short duration, that I am of opinion that even conveyance for tents will have to be dispensed with, and soldiers will have to bivouac. I am induced to consider that these mounted riflemen should be at once established, but they should be a totally independent force, neither cavalry nor infantry. I would rather, however, form them out of the cavalry, because I consider the recruits now-a-days in the cavalry a rather more intellectual class than those in the infantry, they would therefore be better instructed in horsemanship, and understand better the management of their horses, and would soon learn to be good shots. This force I would chiefly employ to escort artillery, and to protect them in taking up positions. My idea is that for a force of 5,000 cavalry there should be 1,000 mounted riflemen, or with a division of all arms, 500.

One other point I should wish to remark upon is the cuirass mentioned by Colonel Baker. No cuirass can resist a shot directed straight at it, but if it is a slanting shot a very slight resistance will turn it, and I should be inclined to consider the light cuirass would be sufficient.

Lieutenant-General Sir PERCY DOUGLAS, Bart.: I must apologise for taking any part in this discussion, never having served in the cavalry, but there are one or two subjects on which Colonel Baker has spoken, in which I have taken very great interest. In the first place I was delighted to hear in his admirable, thoughtful lecture, that Colonel Baker recognised the great truth that the duties of cavalry will be greatly extended in future wars, and that the area of these extended, and wider field duties, must bear some definite proportion to the weight the horses have to carry. It has been a subject of serious thought to many people, and amongst others to myself, how the weight upon the cavalry horse can possibly be reduced. My experience in this direction has principally been at the Cape of Good Hope, when I had the Cape Mounted Rifles under my command, and I had also under my constant observation the Cape armed police. I observed that these mounted police carried everything necessary for horse and man, and that they travelled immense distances over frightful roads and in very bad weather. I inspected these men after marches of 200 or 300 miles, and I never saw a sore back amongst their horses in my life. It then occurred to me to weigh the equipment, and I found it was something very near what Colonel Baker has said to be possible—viz., that it was about two stone lighter than the marching order equipment of the Cape Mounted Rifles. The two forces were thereby placed in this position, that the armed police accomplished work in a month, that the Cape Mounted Rifles could not have accomplished in six weeks. I had patterns prepared of the equipment and sent them home to the Horse Guards some eight years ago: whether these exist in the stores there I know not, but I firmly believe, as Colonel Baker says, that by its adoption, the cavalry equipment can be lightened at least a stone and a-half, and you would still have as good a saddle as the much-vaunted English cavalry pattern. Thus one of the first objects of the cavalry, the lightening the load upon the horse, may be accomplished, and I am glad to see that men of Colonel Baker's wide experience and knowledge are taking this question up.

I was very much pleased to hear from our lecturer the admission of the principle, that mounted infantry are a useful force, and I hope that this is now a mere question of degree. Our gallant Chairman has taken what I was going to say out of my mouth, for the truth of the matter is, one great use of mounted infantry will be, the escort of guns. The escort and the defence of artillery by mounted riflemen will lighten the duties which now devolve upon our very small and attenuated cavalry force. When we come to consider the present aspect of the artillery question, I think you will see the force of this. Our field batteries are now *quasi* horse artillery; they move with rapidity; arrangements are made for carrying upon the limbers, men enough to work the guns, and in fact they did, during the recent operations in Wiltshire, move with the facility of horse artillery. When we consider the immense range of the guns, the great distance they must be at from the solid protection of the infantry of the line, and the independent action accorded to batteries, it is most important that these guns should be properly protected by military escorts. The performance of this duty by infantry is no longer possible, and my opinion is, that no body could afford so efficient a protection to artillery as a specially well-trained mounted infantry force: that is one main object we should have in view

in considering the cavalry question. I am glad to hear that this is admitted in principle, and that it is now only a question of degree. Sir Hope Grant has suggested a certain proportion of mounted infantry. I do not do that at present. Our lecturer has in his very able lecture, divided the consideration of the subject into two parts, offensive and defensive operations; defensive operations meaning the protection of our own soil. Of course in the defence of the country, the auxiliary forces, the Militia, the Yeomanry, and the Volunteers enter very largely, and, I would ask, to what more useful purpose could we turn our Yeomanry than in making them good "mounted riflemen." Good cavalry they certainly never will become. I shall say no more, and I apologise for saying so much. What we want is diminution of the weight upon the horses, and I believe this to be possible nearly to the extent that Colonel Baker says, and it would not be difficult to estimate what would be the widened area of cavalry operations, if nearly two stones' weight be taken off the horses' backs.

Major KNOLLYS, 93rd Highlanders: The lecture given by Colonel Baker has been so exceedingly suggestive, and so short a discussion has taken place, that I trust I may be allowed to make a few remarks. Though, as an infantry Officer, I have had no practical experience, yet I have given a great deal of thought to the subject. I was very glad to hear Colonel Baker say what he did about the mounted rifles, especially with regard to the American war. I always understood the reason why the American horsemen were organised as mounted riflemen was because they had neither time, arms, nor equipment to turn them into cavalry, and I was glad to hear Colonel Baker point out the utter absence of all strategical results from the battles; this, no doubt, was due to the want of an efficient body of cavalry. It has been said by some writers in the papers, that if a body of mounted riflemen came across a body of cavalry they would have to run away, and would be at their mercy. Now I am not quite clear that the boot would not be on the other foot, and that the mounted riflemen would not be in their position, and cannot suppose that any cavalry Officer would allow the rifleman quietly to alight, to get under cover to attack him. On the contrary, I believe he would amuse them in front, and would make an attack upon their vulnerable point, namely, their horses. I think it would be a very desirable addition to the mounted riflemen if there was also a small body of mounted engineers. Very frequently it is requisite to send a body of troops on in advance, to occupy and fortify a defile, or to blow up a bridge, or restore the communication over it; and if a body of mounted riflemen, accompanied by a body of mounted engineers, were sent on such duty, I cannot but think that they would prove most useful. These troops would also be valuable for another purpose—that of carrying succour rapidly to outlying portions of a line of battle. A few days ago a most graphic account was given to me of the doings of the camel corps at the battle of Calpee. There was an outlying redoubt, defended by a small body of infantry and artillery. Three regiments of the revolted Gwalior contingent proceeded to attack it. As soon as they gained the top of a little swell of the ground, they fired: they descended into the next ravine, loaded, and as they passed the top of the ravine, fired again. In this way they advanced by degrees, keeping up a most tremendous fire on the battery, and disabling most of the gunners. At last they came so close that the Officer in command said, "You must draw your swords and do the best you can." At that moment up came two companies of the 80th and two of the Rifle Brigade on these camels. Down went the camels, off went the men, who, without waiting to form, fixed bayonets and dashed at the foe, who looked paralysed, and made for the rear as fast as they could.

Then, with regard to cavalry in the line of battle, apart from the cavalry on the flank, I cannot but think an immense amount of use may be made of them, if they are employed in very small bodies, and distributed along the line, to be kept under cover till the moment they are wanted. In such a case, each leader of a squadron must have the same independence of action as the commander of a battery: for the opportunity would be short, and, unless he seized it at once, and without waiting for further orders, the opportunity would pass away. Colonel Baker said, and everybody admits, that cavalry would have very little chance against unbroken infantry; but there are occasions when we have an opportunity of coming suddenly on infantry, and on those occasions I think that we may inflict great loss. I remember the last

day of the first Autumn Manœuvres, at Foxhill, seeing the Bays come suddenly over the brow of a hill, upon a body of the 42nd skirmishers. Their attack was so unexpected that the 42nd were completely surprised, and, for a moment, they hardly knew what to do. If they had been in action, the cavalry would have been amongst them before they could have recovered their surprise. Also, during the last Autumn Manœuvres, I observed, along the banks of the Wiley, numerous little spurs and ravines, where squadrons of cavalry could have been concealed and kept ready to let slip at the right moment, on many occasions, with the greatest advantage. They could have dashed out when least expected, and have been back under cover almost before they could have been fired at. I think that would have had a most unsteadying effect upon the enemy's skirmishers, as I am sure the possibility of cavalry being behind every swell of the ground, would have a most demoralizing effect upon any enemy.

Colonel DUNCAN BAILBIE, Royal Horse Guards: There is one suggestion that I should like to make. Colonel Baker rightly proposes that the number of men, in every cavalry regiment, should be largely increased. If any serious disaster occurs to our cavalry in war, either from illness or any other cause, we have nothing to fall back upon—we have no reserve, of any sort, except the new reserve which has been formed, and of which we know very little; and I would suggest, whether it would not be advisable that a militia cavalry should be formed in this country, the men being taken on the understanding that, in time of war, they should be appointed to the regular regiments of the Army. A depôt should be formed, with a certain number of horses, say 200 or 300, where these militia might go through an annual course of training, and the new reserve should be trained every two or three years, at this same depôt. We might then have a certain number of men taught to ride. At present, if anything happens to our cavalry, which is very weak, we have nothing to fall back upon, and I am afraid, in a long campaign, our cavalry will entirely break down.

The discussion was then adjourned to Wednesday, March 26th.

Wednesday, March 26th, 1873.

GENERAL SIR JAMES HOPE GRANT, G.C.B., &c., in the Chair.

ADJOURNED DISCUSSION on Colonel Valentine Baker's Lecture on "Organization and Employment of Cavalry."

Colonel GOODENOUGH, R.A.: Sir Hope Grant, I have prepared a few notes, amongst other things, upon the Horse-Conscription-Law of Austria, which was passed about a year ago, which I thought it would be interesting to the meeting to hear about, and with your permission I will read the notes. By the above law, the whole country is divided into Levying Districts, and one or more central places of reception are appointed for each. Every year, the War Department communicates to the civil authorities the number of horses which would be required to be found in order to complete the army from the peace to the war footing, on the basis of the existing organization, or *ordre de bataille*. On the basis of this information the Minister of Agriculture, who is aware from reports annually received through the district-prefects from the chiefs or overseers of parishes, of the number of horses of different classes to be found in each district, which are also classified according to their probable fitness as riding, draught, or pack horses—the Minister, I say, apportions to each district the number of animals it has to furnish. At the commencement of each year, commissions are appointed to each levying district, consisting generally of the civil prefect or his deputy, a field or other officer of the army or landwehr, and a veterinary surgeon, whose ultimate duty it is to pass horses into the service. Each commission is assisted by three sworn valuers, experts, chosen, if

possible, from agricultural or other societies. On a mobilization being ordered, the War Department announces the number of horses required and the time when they are to be delivered, and the civil authorities summon all owners to bring their horses over four years of age, to the Levying Centres. Certain horses are exempted from levy, such as those belonging to the Imperial Family, or which servants of the State or postmasters are obliged to keep to perform their duties, those belonging to public breeding establishments, also all licensed stallions and brood mares certified as such. The passing the horses into the service then begins; those are first taken which the owners are ready to part with for the ordinary remount-price about £25; the remainder are inspected, and those which are adjudged fit for service are valued by the valuers attached to the Commission, and this is done without reference to the remount price, or to the possibly temporarily enhanced prices occasioned by the mobilization. The horses valued, are then passed into the service, commencing with those of the lowest judged value, and the owners are immediately paid their price in cash. Any owner of a horse not yet branded, but passed in, may replace such horse by another serviceable animal of the same category. There are, of course, penalties for non-compliance with the law. To lighten the burden of this forced levy, the parishes of a district are permitted to avoid compulsory furnishing of horses, by voluntary presentation of their proper contingent from their own district. In this case they are paid the remount price augmented by 10 per cent.; but the horses must be produced within 48 hours of the receipt of the order to furnish. Whilst the levy is going on, the owners must keep their horses at their own expense; but the Government Officers must not detain the horses over 48 hours at the Levying Centres. Thus, if everything is in order, it may be estimated that the War Department would be in possession of the horses they require at the Levying Centres within 96 hours (four days) of the receipt there of the order to furnish them. It is worthy of remark, that the major part of the horses thus to be furnished, would be destined for artillery or transport purposes, as the cavalry regiments, 42 in number, are kept up during peace to their full field strength, six squadrons of 150, or 900 horses each, to which is only added on mobilization, a first and a second reserve squadron.

The arrangements in force in the Hungarian honvéds or landwehr,—which forms almost a separate national army by itself,—for keeping up a reserve of horses, are worthy of note here. In the Hungarian honvéds, the plan proposed by Colonel Baker for the formation of a reserve connected with the Yeomanry has been actually in force for about three years; there are about 32 squadrons of cavalry belonging to these honvéds, each of which keeps up a permanent cadre for purposes of training men and horses; they buy annually a proportion of horses in excess of their fixed peace-strength, and keep them at head-quarters till trained; after training, the horses are given out to farmers or peasants who engage to keep them in good order, subject to giving them up for use when required; they are inspected occasionally; and after they have been thus in the farmer's charge for about eight years, they become his property. I have myself seen these horses when called out for manœuvres, and I believe that the system has worked well up to the present time. I think Colonel Baker's suggestions in reference to the formation of such a reserve as this most valuable; for, though we have no such civil organization as prevails on the Continent, and our farmers would not like, perhaps, to be brought into direct connection with military authorities, yet the old established and popular Yeomanry organization would seem just calculated to supply the necessary link between them and the regular cavalry. The staff of a Yeomanry regiment would undertake to provide for a given number of reserve horses, and could without difficulty act as the go-between between the cavalry regiment or depôt, and the farmer who actually takes charge of the animal.

There are also some points with regard to the Austrian cavalry which I thought might interest the meeting as bearing upon this subject. One of the provisions for the composition of an Army Corps—it is a small point, but I think, a very important one—is, that attached to the head-quarters of each *corps d'armée*, irrespective of the strength, or the particular organization of the portion of cavalry which may be attached to that *corps d'armée*, there is always a cavalry general with a brigade staff, unattached, but ready to undertake any special cavalry duties, or to command the divisional cavalry on occasions of its being massed for special purposes.

With reference to the subject of Mounted Rifles, I would like to say that in the Austrian cavalry, the men are regularly trained to act dismounted, though perhaps an objection might be taken to their mode of action, as they habitually leave only one man for the charge of about 10 horses, so that these are immobile. This regulation, however, is obviously subject to modification in view of the immediate nature of the service. The highly talented Austrian Minister of War, Baron Kuhn, has strong opinions in favour of the employment of mounted infantry, and he recently told me that it had been his intention, when a mobilization was contemplated, to mount some six battalions of Jägers for employment in this manner. Baron Kuhn is as much against the mounting of infantry on cars, being of opinion that the multiplication of wheeled carriages with an army, is by all means to be avoided as they sacrifice its mobility. Without reference to the material of the Austrian cavalry, I have the highest admiration of their system in equipment, drill, and training, and spirit. Considering the difficulties they have to encounter in their scattered village quarters, the results they accomplish may really be called astonishing, and I only wish that more Officers of our service would bestow the attention on their system which it deserves. As to equipment, they have no valise; the cloak is carried behind the saddle, and the kit in the wallets in front; the men carry their light carbines strapped on their backs; a section (division) of one squadron is equipped with pioneers' tools, and two or three men in every squad of ten carry that most useful article a canvas water-bucket, calculated to facilitate in a high degree that most important operation of watering, on which our lecturer laid such deserved stress. Adverting to the action of cavalry during engagements, and to their being prepared for attacks on the enemy's batteries, or raids at other times on his train, when the rapid shooting down of the enemy's horses would be so important, I would like to suggest the question whether such services could not be much better performed, if a proportion, at least, of the men of each squadron were armed with a good repeating-rifle. If this arm is ever to find a place it would seem to be in the hands of a mounted man, who is necessarily impeded in the operation of reloading.

One of the features in connection with the Austrian cavalry is, the organization of the so-called field-gendarmes, whose duty it is to aid the staff, acting as assistants to staff-officers in marches in laying out camps, and in reconnaissance, in scouting duties and in the collection of intelligence. They act also as field police, and are employed in what are commonly called ordnance duties, and in the scouting service generally. The men are selected in the proportion of about two from each infantry regiment, or three from a cavalry regiment, every year. They are collected together under Officers who would afterwards be attached to them, and they are all trained together. They do not wear any special uniform, but are distinguished by a red cross belt. I bring forward these particulars as of interest in connection with what the lecturer has told us as to the duties of the cavalry in scouting—that service which we may best know by the name of scouting as distinguished from the ordinary out-post service. There is no great number of these men. The total number for the army is 330 mounted and 450 dismounted men. Each division has only about four. Each army corps about 20, and each army would have about 100 such men. I mention that in order that no exaggerated opinion may be formed as to the numbers of this body.

Captain TRENCH, 20th Hussars: I am very glad that in the lecture which we had the pleasure of hearing last week, Colonel Baker dwelt at some length on the importance of effecting a thorough reform in the whole system of our cavalry equipment. I am afraid, however, that the past history of this question is scarcely calculated to encourage even the most sanguine of us in the idea that any reform is likely to take place for a long time to come. For what is the history of this question? What are the real facts of the case? Notwithstanding all that has been most strongly urged by cavalry Officers for the last five or six years, and notwithstanding that we have had within that time two continental wars,—one, so to speak, almost at our very doors—which have illustrated in a remarkable degree the increased demands which are made in modern campaigns on both men and horses, this question, in the English cavalry for the last quarter of a century,—and, I say it without exaggeration,—has almost stood absolutely still. The English hussar and dragoon and his horse are

still doomed to carry the same cumbrous paraphernalia of luggage; he is still bedecked and bedizened with the same list of heavy, and in many cases entirely useless articles, which it has been the fashion to hang upon him and his horse for the last twenty-five years. Every now and then, by way of a pretence, I suppose, of doing something, some little alteration is made, and it would seem as if we were going to make some real progress in this question. Occasionally, for instance, a saddle weighing perhaps two or three ounces less than the present one in vogue is experimented upon, or the hussar gets rid of the necessity, say, of carrying a collar chain, or some equally useless piece of lumber which it has been so long the fashion to hang either upon him or his horse, that it has become considered in some quarters almost a sort of sacrilege to attempt to lighten him of any of it. As far as any real attempt to grapple with the question and to solve the problem, how to lighten the burden carried by man and horse, no practical effort in the English service has ever really been made. Every unprejudiced cavalry Officer, I think, must agree with Colonel Baker when he states, that it is difficult to conceive anything more unpractical than the present mode of equipping a cavalry soldier in service-marching order. From time to time we hear, as I have said before, that a great deal is going to be done. We heard so in 1866. We heard so more notably still after the war of 1870–1871. Outsiders—and by outsiders I mean regimental Officers—have all heard of committees that have sat to report on this question with a view to a thorough reform being initiated. These committees have nearly all been composed of some of the ablest and most favourably known Officers in the mounted services, and I have no doubt that if the many valuable suggestions that have doubtless been made by them in the course of their duties had been carried out, not only would a reform have been initiated, but it would have been perfected and carried to an end long before this. Often in arguing this point one is met on the part of Officers who are strictly conservative, and who are so wedded to the old state of things that they do not like to move, by the argument that the English cavalry soldier in this respect is no worse off than his continental brother, and that the French, Austrian, Prussian, or Russian hussar carries just as much (which is, perhaps, true enough) as his English *confrère*. I think that this argument is one of the most poor, and at the same time most humiliating that it is possible for an English cavalry Officer to use. It is equivalent to saying that the English cavalry is always to follow tamely in the wake of continental imitation, and is never to lead the path in the way of progress and reform, but that we are to continue in the old groove of continental and notably German imitation, which has so long been the curse and bane of the British cavalry. A most remarkable point in this state of affairs is, that though every one acknowledges and deplores the existing method of equipment, and though Colonel Baker, like many other Officers before him, has pointed out how it may be altered and improved, nothing is ever really done to remedy it. Though our service has advanced far enough in many respects, as every one knows, since 1870, that is, within the last two years, the British cavalry, in the question of cavalry equipment, would have seemed, I might almost say, to have nailed the motto, *quieta non movere*, to its colours. I still hope something will be done, but having been some fifteen years in the service, I confess that I am getting very sceptical upon the point. It is almost a truism, perhaps, to say, that to bring your horses and men as fresh and as little over-burdened as possible into the field, is one of the first elements of success in cavalry operations in modern warfare. But in our service it would almost seem to be lost sight of, that this element of success may, like any other, be squandered by a too rigid and antiquated adherence to obsolete methods of equipment, which ought long ago to have been regarded as mediæval curiosities, and, as such, relegated to the walls of a military museum. At any rate they should long ago have been discarded by us in deference to the requirements of cavalry in modern warfare.

Mr. Clifford Walton, Deputy-Assistant Commissary-General: It is with very great diffidence that I address this meeting at all, because I am not only not a cavalry Officer, but also the branch of the service to which I have the honour to belong, may very reasonably be presumed to have no very intimate acquaintance with the specialities of other branches of the service. But I happen to be a very zealous though perhaps a very humble student of our *past* military history, and while the lecturer was speaking, several facts of our past history struck me as bearing upon

the points under discussion. I do not propose to take up much of your time, but I will, if you will allow me, recall to your minds one or two facts of our military history, and will confine myself more particularly to the subject of dragoons. I need scarcely repeat to this meeting that our modern dragoon is not a dragoon at all, just as our modern hussar has lost all the original characteristics of a hussar. The dragoon that I now propose to speak of, is not a cavalry soldier for infantry duty, but rather an infantry soldier who may occasionally do cavalry duty. The old dragoon was a mounted soldier so trained and equipped as to act as flying infantry. Occasionally he was required to act as cavalry also, but his more proper duty was that of flying infantry. In the very first battle in which the dragoons of our present standing army took part—the battle of the Boyne—there was a very striking instance of the utility of this combination of cavalry and infantry. During the pursuit of the Irish army, General De Ginckell, at the head of some Dutch dragoons, the 3rd Dragoons, and part of the Inniskilling dragoons, came upon a large body of the Irish cavalry who always behaved uncommonly well in that war. They behaved on this occasion with such valour that De Ginckell, with his Dutch dragoons, who were foremost, were driven back, pell-mell down a narrow lane. The Officers commanding the other two regiments, the 3rd and the Inniskillings, seeing what had taken place, drew off into the fields and dismounted their dragoons. They lined the hedges and also occupied a house which overlooked the lane. The result was that the Irish cavalry were so puzzled by being met unexpectedly far from the main body of the English army, by the sudden fire of infantry, that their temporary victory, which might have done great damage, was turned into a rout. In this instance we not only see dragoons acting as infantry in support of cavalry far in advance of the main body, but we see them able afterwards to re-assume the character of cavalry, and re-join in the pursuit. I merely recall these facts to your minds that you may turn them over and see from our past history whether you may not learn something with regard to these points. In 1693, at the battle of Neerwinden, another instance of a quite a different character occurred. It is impossible to say that the victory of the French over the British, and their allies would not have been a victory ultimately, because of very serious flaw in the position occupied, which nobody can fail to see. But at the same time there is very little doubt the French would not have pierced the position where they did, had not the dragoons (of which our English dragoons formed a portion) been retained on the left wing to act as cavalry instead of being detached to the right in the support of the infantry, who were being there overwhelmed, in place of the infantry who were so detached. I will mention but one more instance. In the very next campaign there was another instance quite of a different character again. And let nobody think that we can learn nothing from these facts of past history, for facts are after all the clinching nails of theories, or the coffin nails of theories, and the very circumstances that called dragoons and hussars into existence were the circumstances which now seem, from all I can learn, to call for some change in our cavalry—namely, the greatly increased power of artillery and fire-arms. In 1694 there was a race between the British with their allies, and the French, from the Meuse to the Scheldt. It was of great importance to the French that the allies should be forestalled at the Scheldt, for the French position there consisted of entrenched lines, and if the French lines were forced, the campaign was lost to them. It would be too tedious to recount all the circumstances, but readers of our past history will remember how that was. That fact was palpable. Therefore, the French Commander, with great foresight, anticipating that such a step might be taken by the allies, although he was powerless to prevent it, sent on in anticipation to an intermediate post, about 3,000 dragoons. When the race began the allies had about 80 miles to traverse, while the French had 120 miles to traverse, and by a route which was so cut up with bad roads, so thick with forests, so intersected by rivers, that on the 4th day of the march, the French infantry gave in altogether, and it became necessary to call for volunteers to go on. Although they were allowed to cast away their knapsacks (which in those days were very seldom carried by the troops themselves); and although they were supplied with spirits along the march, yet all would have been utterly in vain, were it not for the main body of dragoons. The main body of French dragoons were sent on with all rapidity, and they marched with such energy that they not only

came close behind the 3,000 men who had been sent on in anticipation, but the English having rather presumed upon having the shorter distance to traverse and so not having put on full speed, they arrived just in time to prevent the attack. In this instance there is no doubt, no troops but dragoons could have performed this duty, no troops but dragoons could have saved de Luxembourg from the result of an attack on the entrenchments. I might have said in regard to the previous instance that I have mentioned, that the battle was one of those in which the student can see that it might have been a battle of infantry or a battle of cavalry, as circumstances might turn out, and in which nobody would be able to prophesy how these circumstances might turn out. It was, therefore, one of those battles in which the utility of dragoons seems to me to be greatly exemplified. I might mention also that in the Irish war to which I first referred, some four men of every company of the 2nd Queen's Foot were formed into a troop of dragoons and did very good service. They were solely infantry men, and were mounted, and they were found of the greatest use. It is possible, perhaps, that somebody might improve upon this idea, and that some such system might be adopted without abstracting from the strength of our infantry, while yet obtaining some sort of real dragoon. I should just like to mention what the original hussar was. It is quite worth while thinking when we hear so much about scouts and reconnoitring parties of cavalry, whether the hussar might not revert to his original *rôle* of a scout. The hussar originally—not in our armies for we had none at all, we were then, as now, incapable of originating a military idea—but in the French service where they were first adopted, was a soldier distinguished for individual intelligence and especially individual horsemanship and swordman-ship. These men were employed particularly in scouting and reconnoitring duties. It is possible then we may return with advantage to the original *rôles* of cavalry by having the hussar for individual irregular duties, if I may so term them, and the dragoon for the duties of flying infantry, and the cuirassier for the duties of the charge in which last, nevertheless, all the others might join. For they might be trained so as to perform their particular duties, and on occasion only, to join in the general duty of cavalry. With regard to the cuirass, an idea has often struck me, and I dare say it has struck others. It is this: I do not see why the cuirass should be made as flat as it is. I would suggest that it should be made having a series of angles, rather acute angles, something like a bees' cell cut in half, because in that case a bullet striking it must go off at a tangent. It is very seldom that the bullet would strike the very small face which would offer itself on the different sides.* That is an idea which has struck me, and I throw it out for consideration.

Lieutenant-General Lord GEORGE PAGET: Not having been present when Colonel Baker spoke last Wednesday, I know not whether he dwelt on the one point to which I would now refer, but I know that he and every cavalry Officer will cordially agree in the remark I am about to make. It is this: without entering on the question of how far the establishment of these mounted riflemen, of whom we now hear so much, may be of advantage—and I, for one, believe that they might be of much use in modern warfare—I would urge the impossibility of their establishment as part of a cavalry regiment, as it is at present constituted, and unless there is a greater proportion of men to horses. Everyone knows that at soldiers' games, for instance, of an afternoon at Aldershot or elsewhere, while crowds of infantry soldiers are enjoying themselves, hardly a cavalry man is to be seen. He is hard at work cleaning his appointments, &c., and has no time for anything else, and he cannot have added to his duties, the instruction in the use of arms of precision. Besides, for many reasons, I do not think that mounted riflemen, who are to use arms of precision, should have to groom horses. Therefore, I say, before the contemplation of such an addition to the calls on the time of the cavalry soldier, it should be determined as an established

---

* Another idea, that I omitted to mention until after the discussion, is that cuirasses might be made of *cuir bouilli* instead of metal: if made in a series of angles they would, I expect, be found equally effective for defence, while they would be lighter to carry, far more cleanly on active service, and an economy of the soldier's time in garrison.—C.W.

fact, that there should be a greater proportion of men to horses than there is at present.

General Sir WILLIAM CODRINGTON: I dare say some Officer here can tell us what is the system of the Prussian cavalry in this respect, namely, as to whether their regiments have as many horses as men. I think the number is 500; but it is so totally different a system to that which is advocated by cavalry Officers here, that if there is any Officer who knows the habits of the Prussian cavalry, it would be an advantage to have information on the subject. I think I am right in saying that the Prussian cavalry have no spare men in their regiments, that every man is mounted. (Colonel BAKER: Nominally, it is nearly so.)

The CHAIRMAN: Gentlemen, I beg to say a few words with regard to Colonel Baker's excellent lecture. And in the first place I should wish to make a few remarks about mounted riflemen.

There is no doubt that mounted riflemen have become absolutely necessary for the service; but I would make them a separate corps altogether, being neither cavalry nor infantry. To form this corps I would pick out men from cavalry or infantry regiments—the best men that could be obtained from their intelligence and activity—they should be made available for any purpose, and when used as infantry, the centre man should hold the two outer horses.

In Colonel Baker's lecture, on the subject of horses, he states,—"to effect this, it is suggested that, in place of the present tax upon horses, an *ad valorem* duty should be imposed; that all horses classified by their owners at a certain value, which would be within the limits of reasonable expenditure for military purposes, should be inspected, and that such as were eligible, should be registered. That horses so registered should, by Act of Parliament, be liable to be purchased by the Government at their classed value in case of probable war or invasion; that in consideration for such liability, these horses should be exempted from taxation whilst remaining so registered."

This project of Colonel Baker's I am inclined to conceive would be very difficult to carry out in this country. The so-called liberty of the subject would be interfered with; and I cannot conceive any Act of Parliament would ever be passed to compel a man to retain his horse for Government purposes at a comparatively small price, when a purchaser might come forward and offer a higher sum. At present, I understand from the returns, there are no less than 300,000 more horses in the country than there were ten years ago, and I can only say that at Aldershot the remount-horses of the 13th Hussars and of the Carabineers are the best lot I have ever seen. They have good legs, good shoulders, and fair action, and the Commanding Officers tell me there is no difficulty in obtaining them. Of course everything is increasing in value, and Government will be obliged to pay more for their horses; but they are to be obtained, and without any difficulty.

I quite agree with Colonel Baker in considering a "cavalry reserve" as most essential. It should, I consider, be carried out according to the Prussian system, viz., on service to have three or four squadrons for the field, with one squadron at home to supply deficiencies. It is the only way in which cavalry can be well kept up. And if a good reserve is not formed it will be just as it was in the Crimea, when, as mentioned by Colonel Baker, at a review, only one squadron was able to turn out, formed from the whole cavalry force.

There is another point at page 381, where Colonel Baker says,—"Officers commanding cavalry regiments, and the Officers buying for the Royal Artillery, would be allowed each year to purchase an additional per centage of horses. These horses would be trained with their respective corps for one year, and the additional per centage so purchased, would then be handed over to the Yeomanry upon the following conditions:—They would keep these horses at their own cost; would ride them when under arms with their regiment; would maintain them in good condition, as certified by periodical and reported inspections by the Yeomanry Adjutants. They would give them up, if required, for five weeks after harvest."

I can hardly imagine that this proposal could ever be carried out with advantage to the service. For instance, the cavalry and artillery would not be inclined to give up good horses that they had trained and had in their possession for a year; and I should also think that these horses kept by small farmers—for I suppose they

could not be considered rich or wealthy men—would be kept in good condition. They would be used for all sorts of work—in ploughing and drawing heavy carts—and many of them would become useless for the service.

Then Colonel Baker states that lancer regiments should have nothing but a lance and carbine. The late Earl of Rosslyn, my Commanding Officer in former days, was most anxious to arm the 9th Lancers with the carbine. He tried it, fitted in nearly the same way as it is carried at present, behind the leg, and in the old way in which it was before, but he found it so interfered with the lance as to be quite impracticable. It would, however, be most advantageous to the lancer to carry the carbine, and I would put it across his back. Any gentleman who has been in India and has seen the way the irregular cavalry carry them over their backs, must know the advantage of this. They take off the carbine at the full gallop, fire it, and return it without stopping. It does not wear-out the clothes, and it does not wear out the man.

I also do not concur with Colonel Baker in the suggestion to do away with the pistol, especially with the lancer, unless he has a carbine. Every man without the latter should have a revolver attached to his person. The Prussians carry the common pistol in a small holster, attached to his body by a strap over the shoulder.

With regard to his proposed system of flag-signals, at present at Aldershot it is in such an unsatisfactory and imperfect state that it is of little use. A new system is about to be established by which information will be more correctly afforded.

There is one point in which I quite agree with Colonel Baker, and that is with regard to the scouts. I think his system is a very admirable and good one.

Captain Trench, in what he stated, threw cold water upon the continental system as carried out in our country. Now, it appears to me rather out of place to state this, as we must feel the Continent has had a great deal more experience in warfare than we have had, and it is necessary to take the best examples in everything. We have to improve our system, and it is to our advantage that we have copied the Continent in many things relating to war.

There is one point which I forgot to mention, viz., about the kit of the men. I am of opinion that the cloak should be carried in rear of the saddle, and that the man should only have—besides what he has on him—a complete suit of blue flannel, viz., a pair of trowsers, a jacket, and a shirt. The trowsers should be carried under his seat, in the way the Prussians do, only that their trowsers are made of canvas. On service a man should not shave, or polish his boots. A little oil or grease would be sufficient to rub over them He should also have a pair of highlows. This is nearly all a man should carry on service.

Major WEBBER, R.E.: Colonel Baker has referred to the use of cavalry mainly for purposes of intelligence, as having become more and more important, owing to the greater necessity for that intelligence being early.

The collecting of intelligence as one of the most important duties of cavalry, has always been recognised in the history of war, and we find the Duke of Wellington in the Peninsula only using his German cavalry for that purpose, in preference to his English, because the Germans were men who took more quickly to, and were more to be depended upon, for work of that kind. As we cannot always depend on mercenaries, and as the covering the front of an army with intelligent men at a very early period of a campaign is so necessary, it is obvious that the training which Colonel Baker describes as having been so easily imparted to the non-commissioned officers and privates of his own regiment should be universally given. And with reference to this, I cannot understand Colonel Baker's statement, that no cavalry quarters except Aldershot and the Curragh, has been found by him to afford any fair opportunity for proper instruction during thirteen years' experience.

I should like to ask Colonel Baker what impediment exists at Shorncliffe, Norwich, and other stations, or even in the neighbourhood of London, to using the surrounding commons and roads for instruction in outpost duties. It is true that the inclosures may not be ridden through; but it seems to me that as we find no difficulty in teaching cadets and Officers to reconnoitre on enclosed commons without trespassing, a large proportion of the duties of cavalry in patrolling and outposts, can also be taught, even if the men never left the beaten tracks.

I am very glad that Colonel Baker has recognised that outposts and their videttes

or patrols, have a different duty to perform to scouts. Perhaps it will be allowed that these duties may be classified as passive and active. The one reports what he observes from a fixed point, or from a moving point, which maintains a constant relative distance between it and its support; the other *searches* for intelligence, using his own judgment to guide him in all he does.

It is not too much to say that this distinction holds good in every operation of war. Whether an army is advancing, retreating, or stationary—whether it is covered by cavalry or infantry posts, there must always exist a fringe of *look-outs*, placed according to the accidents of the ground and (definitely) with reference to the covering force. But it not the duty of these *look-outs* to wander in search of intelligence, and it is this constant difference that distinguishes the "look-out" from the *scout*. That this scout, who is a most important means of collecting intelligence, should be exclusively part of the cavalry organisation of an army I cannot agree with Colonel Baker in thinking. Take, for instance, the advance of the Prussian 3rd Army and the Army of the Meuse on Paris after Sedan. This advance was covered by two divisions of cavalry, but when the front came near Paris, the cavalry turned to right and left, and passed round to the west, the infantry corps coming to the front. I would ask Colonel Baker if he considers that in such a case all the intelligence on the east of Paris should have still been collected by cavalry, and transmitted through the cavalry head-quarters before reaching the Chief of the Staff?

This is only one of innumerable instances that could be given to show, that although cavalry is the best, and, we might say, the only arm suitable for screening the operations of an army, it does not also follow that its utility as a means of collecting intelligence, goes beyond the observations of what comes within its range in performing that most important duty.

I feel pressed to say a few words, which necessarily follow on Colonel Baker's remarks about "signalling;" the Signal-corps of the Southern Army at the last Autumn Manœuvres, consisting of 16 Officers and 76 non-commissioned officers and privates, having probably been worked on a larger scale than has been before attempted, I think it is right to explain the arrangements then made, as Colonel Baker will be glad to hear that their tendency was to meet the view which he takes, namely, that the signallers should be attached to brigades. Every Army-Corps-order that was issued on the subject, tended to make the brigade the unit for signalling purposes; and the simple reason why the signallers were not left always to work with their brigades was that half of the Officers and men had to be taught the rudiments, and the rest knew little of the application. Thus, like all branches of the service, the signallers were under instruction, and if they had been left entirely to their brigades, I venture to say, that in many cases they would have learnt nothing. As it was, on each occasion, when not required to open or maintain communication for head-quarter purposes, the signallers remained with their brigades, and with that view the following orders were issued:—"Should a detachment from one or several brigades march "on duty, a signal-party will, as a rule, accompany it; the Senior Signal-Officer "present, to make the necessary arrangements. If a brigade is in reserve, one of its "parties will be ordered to report itself for service at the divisional head-quarter "station. As a rule when the army is not in action, the brigade-signallers will be "employed sending information from the front to head-quarters. When in action, "the Signal-Officer's chief duty will be to keep up communication between the Bri-"gadier and the divisional head-quarter station. Lateral communication need not "be established unless specially ordered. Brigadiers will be requested to advise "the senior Signal-Officer of their brigade, of any proposed movement or detachment "as early as possible. The senior Signal-Officer to report himself daily to the Bri-"gade-Major of his brigade; the hour being specified in brigade orders. If, during "the day, the brigade is about to make any other move, the Signal-Officer will also "report himself before the brigade moves off, in order to make himself acquainted "with its general objects." Colonel Baker himself suffered, I am sorry to say, for the great efficiency of the signallers in his own regiment, by being thus at times deprived of the services of a larger number of men than other Commanding Officers; but if the operations had continued longer, he would have found that, as the Brigadiers grew more to use the signallers, and the men became more expert, they would have been less detached for special purposes, when the head-quarters would have depended only on the engineer signallers.

When the cavalry of the Southern Army advanced to the great ridge above the Wiley, the Officer at head-quarters who was in charge of the signalling was attached to the General commanding the cavalry, and all the arrangements of that day were made under his instructions, and between twenty and thirty messages were forwarded to the head-quarters of that Officer during the day from a look-out post in the front. If from the independent action of the signal parties and of the *scouts* and *look-outs*, the consequent confusion of intelligence arose which Colonel Baker describes, it seems to me that it is only confirmatory of his remark, that signalling, as a means of communicating intelligence is not understood, and therefore not encouraged. By encouragement, I mean recognition. A signal Officer, who is fully as intelligent as a scout, when he has established a signal station to which the scouts should carry their intelligence, is not a little surprised, and perhaps disheartened, to find that a horseman is galloping off with intelligence that he knows he can send without wear and tear to horses' legs, and to be told by the scout that he knows nothing about him, and that his, the scout's, intelligence is destined for some point where he believes the Officer commanding the cavalry to be at that moment, perhaps miles away from the point where the signal Officer believes him to be.

If manœuvres were actual war, no doubt signalling would find its place, and the General who knows best how to use it, will obtain a corresponding advantage; but as manœuvres are a means of instruction, a cavalry Brigadier and his Brigade Major are naturally thinking of other things which, at the moment, are of more vital importance, and therefore signalling, which essentially requires a knowledge of its powers by those who employ it, receives little attention, and is in proportion not dependable.

Captain HOSEASON, R.N.: In the very interesting paper read by Colonel Baker, he has named the total proportion of animals to men. This is the first time we have had these facts so accurately stated, and we find the proportion, in round numbers, to be as 1 to 3, or 13,000 animals to 37,000 combatants. In many previous discussions in this Institution, a far greater number of animals was supposed to be necessary. It has even been stated that the numbers ought to be equal; or, supposing a force of 100,000 men invaded this country, 100,000 animals would be required to be brought over; but Colonel Baker states that the Germans have found in their late great wars the smaller number sufficient, when supplemented by auxiliary transport obtained by requisitions.

In addition to the service performed by cavalry in outpost and scouting duties, there are those of foraging and requisitioning, two very arduous and important duties, which will always make the services of cavalry of great value, as the supplies thus gathered may be drawn from a large area of country instead of from fixed bases of operation; this was sufficiently proved by the activity and ubiquity of the German cavalry in the late war with France.

In the discussion on Mr. Vernon Harcourt's paper, much misconception as to the facility of transporting cavalry by sea, arose from facts not being clearly stated, and the present value of steam transport fleets not being better known. Mr. Harcourt appears to have been unaware that two steamers of only 2,500 tons burthen, belonging to the General Screw Company, in the service of Government during the Crimean war, conveyed respectively 640 and 560 horses each, and that the voyage from Varna to Eupatoria, a distance of about 300 nautical miles, was performed in about a day and a half. The horses were nearly all placed in the vessels' holds, and they were embarked with all their accoutrements on them complete, and not a single article of those stores was missing when the force was landed at Eupatoria. The whole force moved was 50,000 men, with a great amount of animals and stores, and the operation was conducted under the auspices of Captain, now Rear-Admiral, Eardly Wilmot, R.N.

I need hardly point out how simple must be the task of moving any amount of animals in the present day, with the improved means of steam-transport we have at our disposal, in vessels varying from 500 to 5,000 tons burthen, and driven at velocities varying from twelve to sixteen knots per hour. A few hours alone will suffice for the transit, if the ports to be reached, are Calais, Boulogne, Ostend, Flushing, or Antwerp, for the maximum distance of over-sea transport from Dover to Flushing is eighty-seven miles.

Colonel BAKER: I will now notice very briefly in reply, the different remarks that

have been made by those gentlemen who have joined in the discussion to-day. Colonel Goodenough has been kind enough to give us some information relative to the Austrian system of reserve horses. Yet from what he has told us to-day, I should myself prefer the Prussian system. The Prussian system prepares for war beforehand. The horses required are known and registered, and they have nothing to do but to collect them on the outbreak of war. It appears by the Austrian system that although the horses are known, they have to be selected and purchased after the outbreak of war.

Colonel Goodenough has spoken about repeating rifles, and he urged that repeating rifles might be given to cavalry. Now the Henry-Martini rifle, which will be shortly issued to the cavalry, is really such a very good weapon, and can be loaded so rapidly, that I think its simplicity more than counterbalances any advantages that would be derived from the use of the repeating rifle.

Colonel Goodenough has also mentioned that a system exists in the Austrian Army by which men are specially trained as scouts. It appears that very few men are so trained. The plan, no doubt, is valuable, but it seems to me that if the system of garrison instructors which has now been established in different camps and in large military stations were increased, so that we had regimental instructors, we should have a means of instruction for both men and Officers, which would be most valuable. I mentioned the other day that I had endeavoured in the 10th Hussars to carry out that system, but it was done under considerable difficulties. It is quite evident if we had regimental instructors attached to our regiments, their duty would be to instruct Officers, and also to instruct the men in the special class-duties—if I may so call them—which should be known preparatory to trying scouting duties upon a practical scale in the field.

I will now allude to the remarks which were made by Captain Trench. I think he made one mistake when he said that the Austrian and Prussian cavalry carried more weight than our own. That was the case, but certainly now on service neither the Austrian nor the Prussian cavalry would carry the same weight which is laid down for English cavalry.

Referring to the remarks made relative to the old history of dragoons, the gentleman who made the remarks seemed, I think, to be unaware that dismounted duties are more or less practised by the cavalry of the British Army at the present moment. I am sure certain Commanding Officers—and I myself have always laid great stress upon it—have paid great attention to the instruction of their men in dismounted duties, but I think that we hold generally that there is a limit to this instruction, and that if we attempted to train our men really as infantry when dismounted, we should deprive them very much of their value as cavalry. In the first place it must be evident to everybody, that a cavalry soldier dismounted, cannot be on a footing with an infantry soldier. His arm is a shorter one: it has not the same range. Again, he carries no bayonet, and if it comes to close quarters he is at a manifest disadvantage. All this should be taken into consideration. My own view is that we shall make a great mistake if we attempt to revert to what I may call the bastard dragoon—a system which has been tried from time immemorial, but which has always failed, because the dragoon, if attempted to be made an infantry soldier, invariably becomes more of a cavalry soldier, and only a bad one. What I think we should find most useful, would be to have a small force of infantry mounted and attached to the cavalry, composed of highly trained special troops. I myself would not even give them a sword, and so would prevent the possibility of their ever becoming cavalry. I would keep them as special highly trained infantry, to be used on emergencies or particular duties.

I will now refer to what was said by Lord George Paget, and I am sure he will carry the whole cavalry service with him with regard to having plenty of extra men for the horses. We all know, if you get a large proportion of men to horses in cavalry regiments, you have a number of trained men in case of emergency, and that the horses, when they are purchased or provided (as I trust we shall have them provided in course of time), are much more rapidly trained than the men. The horse can be trained in the course of a few weeks, whereas a man cannot be trained in anything like that period, or under one year.

Sir Wm. Codrington asked a question relative to the cavalry of the Prussian

Army, and referred also to the number of dismounted men, or rather the apparent absence of dismounted men in the Prussian service. I think that this is more apparent than real. I stated the other day that in continental armies generally, such arrangements are made that the dismounted men of cavalry are not drawn upon to the same extent when war commences, as in the cavalry of the British Army. For instance, as I mentioned the other day, we all know when we go into the field, regiments are immediately applied to for dismounted orderlies and staffs of brigades and also of divisions. That does not exist in the Prussian service, but the staffs are made up beforehand, and the Prussian *etappen* also really assist in a great many duties which at present fall upon our cavalry very heavily.

Referring to what was said by Major Webber, I am sure he very much misunderstood me if he thinks that I underrate the value of flag-signalling. I think flag-signalling, if properly used, may be very useful, especially in outpost duties. I do not think we ever can trust implicitly to it. We all know that even a change in the weather, a foggy day, or a misty morning, renders flag-signalling useless, and therefore it would be very foolish, to my mind, to trust too much to it. But on the other hand, if we had a system thoroughly understood, if we aimed at what was possible and did not attempt too much, it certainly might be most useful. And I think the reason that flag-signalling has not made more way than it has, has arisen from there being no definite place for it. I think if we could look upon it as an adjunct to be used especially in outpost duties, it might be very useful, and I for one should be most glad to see it brought into more general use in the service.

Major Webber asked me whether I had not stated that there was great difficulty under most circumstances in giving troops proper instructions in outpost duty, and he mentioned the cases of Shorncliffe and Norwich. Now, I have had detachments at Shorncliffe and been stationed at Norwich, and I must say in neither of those stations do I conceive that outpost duties can be practised properly on a large scale. Those who know Norwich and Norfolk, know that it is a very enclosed country. It is true that there are a few small heaths which may be sufficiently large to give recruits a sort of commencement of instruction, but I do not consider that in that county,—unless we have power to go over land, really to trespass, and unless those powers are given to us by Act of Parliament—it is possible to carry on outpost duties for cavalry upon the scale which I conceive should always be practised.

He has also remarked upon what the Prussians did at Paris, and he asks me whether I conceive that the duties of getting information should be exclusively confined to cavalry. Of course where infantry are placed in such a position that they are enabled to obtain information—and the siege of Paris was principally an operation of infantry and not of cavalry—then such information should be given by infantry as well as by cavalry.

Captain Hoseason has touched upon the question of scouts, and of foraging and requisition duties. I dare say Captain Hoseason is aware that the Prussians have no special corps for requisitioning, but it is a duty which falls occasionally upon cavalry or any body of troops acting in a hostile country and naturally having to make use of that right, and being accustomed to it, the Prussians shewed quick aptitude for it. Captain Hoseason has also touched upon the question of the decrease of cavalry being possible.

Captain HOSEASON: No. I said one of the heavy duties put on the cavalry is that of foraging and requisitioning, and with that I said I imagined that the inability to transport any amount of cavalry would prevent the sending of a large force.

Colonel BAKER: I understood you to say that cavalry might possibly be decreased and against that I was going to urge that the Prussians considered it necessary to make an increase.

With regard to the cavalry transport, I most cordially agree with Captain Hoseason. I do not think we have taken into consideration the immense facility which these very large steamers will give in the transport of horses. It is a question which really merits the greatest possible attention, and instead of leaving it to be provided for when war arises, and everything is naturally in confusion, I think that it is one which ought to be thoroughly gone into at the present moment.

I think I have now touched upon all the points which have been noticed, with the exception of the remarks of our Chairman. The points I shall notice in his remarks are those relating to reserve of horses. Sir Hope Grant has stated that he thinks that the system which I proposed, namely that there should be a reserve of trained horses kept up with the Yeomanry, and a reserve of transport horses kept up by a system of previous registration, would not work in this country. With regard to the first question, namely that of trained horses, I cannot see why we should not make use of the Yeomanry for that purpose, especially when we find from Colonel Goodenough to-day that this very system—and I was not aware of it before—has been tried by the *honvéd* cavalry and has been found to answer very satisfactorily. I think this is a great proof that we might attempt some similar system in England with regard to our Yeomanry.

Sir Hope Grant also touched upon the question of the registration of horses. What I proposed was that there should be an *ad valorem* duty in place of the present tax upon horses, and I will just explain my meaning rather more at length than I was able to do in my lecture the other day. I dare say you are all aware that agricultural horses are at present exempt from taxation, but there are upwards of 800,000 horses now paying taxes in this country. That tax is at present 10*s.* 6*d.* per horse. What I should propose would be that, assuming an amount which would be recoverable to be given in case of war for horses for military purposes,—if we say £60 or £70—that horses classified by their owners as of that, or below that value, should pay the present tax of 10*s.* 6*d.*; that horses classified between that and £100, should pay, say 15*s.*, and that horses valued at over £100 should pay a further increased tax, or, we will say £1. The working of this plan would be as follows:—If anybody wished to exempt his horse from registration and from possible requisition, he would naturally rate him, we will say at £100, or 15*s.* tax. He would pay a small increased tax, and his horse would not be liable to requisition in case of war. Therefore, it would be only those who with their eyes open registered them below £60 or £70, as the case might be—whichever sum might be determined upon—who would have their horses liable to requisition. I must say I cannot see any very great hardship in this, especially if you absolve those horses from taxation. I do think we are all in this country too much inclined to lay unnecessary stress upon the "liberty of the subject." Whenever any great scheme of military organization is brought forward, we immediately hear of the "liberty of the subject." But I remember—and it was only four years ago, in 1869—urging the necessity for Autumn Manœuvres. I was then met on all sides by the question of, "Do you consider it possible in a country like this, where people have their rights, and where they are so tenacious of their rights, to have 'autumn manœvures,' and to manœuvre over other people's ground, whether they like it or not?" They said to me, "Do you think for one moment people would allow autumn manœuvres in September, when they would have their partridge-preserves gone over by troops and disturbed in this sort of way? It would be impossible, and any Ministry who dared to bring such a thing forward would not be in office for a day." What did we see? After a little time the Ministry did bring it forward. There was not even a division in the House upon it. The Act was passed; we have for two years had "autumn manœuvres," and we find people from all parts of the country are scrambling to get the troops to manœuvre in their districts. I must say, an Englishman, although he may be very tenacious of his rights, has some regard for his duties, and I do think that if the question of the reserve of horses—for we must all allow that a reserve of horses is imperative, and that without it our military efficiency is *nil*—I think that if that question were placed before the people of this country in a straightforward common-sense way, they would make their duties rise superior to their rights.

The CHAIRMAN: I think that the lecture has now been fully discussed, but before we go, we are bound to return our best thanks to Colonel Baker.

IS A RADICAL CHANGE IN THE TACTICAL FORMATION OF OUR INFANTRY REALLY NECESSARY?

A Lecture delivered at the Soldiers' Institute, Fort William, Calcutta, by Lieut.-Col. and Brevet-Col. The Hon. FREDERIC THESIGER, C.B., A.D.C. to the Queen, Local Major-General, and Adjutant-General in India.

MUCH has been written since the late war between Germany and France regarding the changes which it will be necessary to make in the tactical formation of our infantry attack, so as to make it applicable to the altered conditions of modern warfare; and it seems but too evident that the deductions which modern writers on the future tactics of the British Army too often draw from the experience of the late war are, that our two-deep line formation, so long regarded as a thoroughly British institution, must be looked upon henceforth as impracticable, and that the German skirmisher-swarm formation must take its place.

Now if there be any value in the words of the author of "A Tactical Retrospect," that "to change that which has become customary and deeply rooted in an Army is always a critical matter, *but to make wholesale alteration is ruinous*," it would seem wise, before finally accepting a conclusion, which brings a revolution in its train, to pause and carefully consider the grounds on which it is based.

The following extract from one of the essays written for the Wellington prize, shows clearly the line of argument adopted to prove that the line formation is unsuited to the tactical requirements of the day:—

"The aim of a tactical system should not merely be to produce flexi-
" bility, the power of conforming to the exigencies of the situation, and
" the irregularity of the terrain, but elasticity, the power of regaining
" the original shape, the primary formation.

"The line formation, as the chief feature of our drill, provides us
" with neither of the above requirements to any extent, but simply
" gives a rigidity that occasions both slow movements, and consequent
" longer exposure to fire, and also the utter impossibility of utilising
" cover, or suiting the dispositions to the ground.

"The range of fire has so much increased, that everything must give
" way to rapidity of advance; and while the battalion column is too
" large, too marked an object to attempt the forward movement without
" risk of annihilation, the line is so slow as to suffer almost equal loss.
" The deployed battalion of infantry is just as deadly an order, if long
" under fire, as the more compact columns, moving from cover to cover
" with quickness, and presenting but a small front to the adversary's
" projectiles."

Now there are no less than sixteen sections of the Field Exercise Book which describe the different methods by which a line can be made to conform to the exigencies of the situation, and the irregularity of the terrain, and afterwards to regain its original shape, its primary formation. They will be found under the headings :—

Formation and movements of a battalion in line.
Formation of column from line.
Formation of line from column.
Deployments.
Movements and changes of front in échelon.

A battalion in line can be sub-divided without confusion into as many parts as there are companies; and as these companies are now not required to preserve any special numerical order, it follows that the line can be broken up and reformed with the greatest facility and without the slightest confusion.

The necessity for great flexibility and elasticity in an attack formation having only lately been fully recognised, no real attempt has as yet been made to bring out the full powers of the line; and the formation has been condemned, not because it does not possess these essential qualities, but because, having been allowed to lie dormant, they have been overlooked or misappreciated.

"The days no doubt are past," as says another writer of one of the Wellington prize essays, "when successively deployed stiff lines of infantry could advance as we did at the Alma;" but if troops in line are only handled so as to meet the requirements of the day, and so as to avoid unnecessary exposure to fire, the formation will, I believe, assert its superiority over any other in the same manner as it has always hitherto done.

The most serious charge of all which have been brought against the line is slowness.

I am not prepared to admit, however, that the line, even under its present conditions, is necessarily slow; and I am sure that any well drilled battalion without any previous practice, will be capable of advancing or retiring in that formation, in double time, for a considerable distance, without any material disarrangement taking place.

But if the advance be made by échelon of half battalions or of companies, the most rapid pace becomes perfectly feasible.

It is possible that it may be found advantageous to allow more freedom to troops advancing in line, by giving each man in the ranks 30 inches instead of 24, or by giving each company a small interval between those on its right and left: these are minor points which can easily be worked out on the drill-ground.

The real question for consideration is, can troops in two-deep line formation be brought over a distance of, say 2,000 yards, under the fire of modern artillery and breach-loaders, with as little loss as would be incurred by an equal number of troops moving over the same distance in the skirmisher-swarm formation?

2,000 yards appears to be the distance which most writers admit will fairly represent the space to be traversed by an attacking force under the effective fire of an enemy holding a strong position. But for

the first 1,200 yards, in all probability artillery fire will alone have to be considered, as modern practice seems to condemn the system of pushing skirmishers forward in front of a defensive position. You will find at page 428 of the latest edition of "Hamley's Operations of War," the following passage:—

"The first question is, whether the line of skirmishers which has "hitherto generally opposed the assailant's skirmishers in front of the "position, is still appropriate. Before a sustained attack in force, these "skirmishers must, as a matter of course, be withdrawn. But to retire "in face of breech-loading arms, and in presence of such a force as the "skirmishing line of the assailant now comprises, would be a costly pro-"cess; and the defender's skirmishers would certainly suffer far more "loss than they would inflict, while a brisk advance might bring the "enemy almost to the position at their heels; when the fire of the "main defensive line must, in some considerable degree, be masked by "its own skirmishers."

"The first line must then be that which first opposes the enemy, "and it must be carefully sheltered in order to derive due advantage "from the defensive."

This view is in accordance with the experience gained in the late war. Boguslawski says, "Occupy in force the actual line of defence "with strong bodies of skirmishers, advanced posts should only be "occupied when they are particularly tenable."

At 2,000 yards a 9-pounder rifled gun, firing shell, has an error *longitudinally* of about 80 yards, and *laterally* of about eight yards. Therefore when a battery fires with a clear view of the object at 2,000 yards, the range being known precisely, and no mistake being made in the service of the guns, it is to be expected that a shot will be sometimes 40 yards short, and sometimes 40 yards beyond, or sometimes four yards to the right, or sometimes four yards to the left of the target.

The longitudinal error being therefore so much greater than the lateral error, it follows that the deeper the formation, the more chance it has of being hit; but the lateral error being so exceedingly small, a greater or less *breadth* of formation really makes no appreciable difference in the value of the target.

Viewed simply then as an object to fire at, it may be said that the two-deep line is the target which artillery would least like to have opposite to it. Of course if troops in such a formation are kept moving, the difficulty of hitting them increases enormously.

Under artillery fire alone, therefore it seems certain that troops which are kept in the formation nearest approaching a line will suffer the least loss; and consequently by dividing a regiment advancing to the attack into three lines of skirmishers, supports, and reserves, the chances of casualties would seem to be actually increased.

From 800 yards up to striking point, the effectiveness of modern infantry fire has increased enormously, whereas the effectiveness of artillery at these close distances has not improved. Case fire from rifled guns ranges to a rather less distance than that from the old smooth-bore guns, and at very close distances it is about as effective.

A well-aimed infantry fire is therefore more effective than the case fire of artillery, and consequently the latter cannot remain within case distance of unbroken infantry unless the battery is intended to court almost certain destruction.

Such being the opinion of one of the *great artillery authorities of the day, *it is clearly permissible to eliminate from my calculation the effect which artillery fire is likely to produce on infantry advancing to the attack from 800 yards.* That effect is shown to be no greater than formerly, and therefore the attacking force will not be called upon to sustain any more increased strain on its enduring powers than it would have had formerly under the fire of smooth-bore artillery.

In the advance then from 800 yards the effect of infantry fire alone will be considered.

"In the field, one has to deal with fire more or less well aimed, and "more or less blindly delivered. It is customary to consider the first "description of fire only as effective, and to look upon the last as thrown "away. Both descriptions, however, fill up a certain space of ground "with projectiles."

"In peace we very properly set value only upon aimed fire, and in "war we very properly desire our soldiers to aim; but a leader should "be aware notwithstanding, that the enemy's unaimed or badly aimed "fire has a great importance. The shot which misses its mark can pro-"duce effect near it. If it passes over the mark it makes the ground "beyond unsafe. Shot do not only produce effect on the mark aimed "at, but create an unsafe region along the whole line of their course; "and unaimed shot kill and wound as well as aimed."

"In any case this fact deserves the greatest consideration, viz., that "under small-arm fire we have never to deal with more than 25 per "cent. of shot which are aimed."

The same authority† lays down that firing is as a rule too high. It therefore follows that if only 25 per cent. of the shot are aimed (that is to say are on or about the mark) then *nearly 75 per cent. go over the mark*, and depth of formation must entail a loss which will go far to neutralize the advantage which an extended order must of course give to the attackers when under the fire of breach-loading rifles.

But from the instructions laid down, it is clear that when the enemy's fire becomes really heavy it is intended that the front line of the skirmisher-swarm formation should be reinforced until it contains every man in the battalion—for they say:

"The attack to commence by a general advance. If required the "skirmishers would be reinforced by the supports and by the reserve of "the skirmishing battalion."

Now if the front line of skirmishers (two or three companies) are found sufficient, without being reinforced, to drive the enemy from his position, it is clear that the defence must have been of such a weak

* Ruft Prince of Hohenlohe Ingelfingen, Major General Commandant of the Brigade of artillery of the Prussian Guard.

† The art of operating under the enemy's fire with as little loss as possible, by Major Tellenbach.

nature as not to require any very special disposition to be made against it.

As, however, the new attack formation has been introduced for the express purpose of neutralising the formidable difficulties which the defence of a position by troops armed with breech-loaders is supposed to present, it may I think fairly be assumed that the reinforcement of the front line will nearly always be necessary. This view is corroborated by the experience of the late war, for Boguslawski says that, "It happened frequently that soon after the beginning of an "action, a whole regiment (three battalions) fought extended into a "line of skirmishers, and that often the regiment in second line, if not "already directed to incline to the right or the left, was required to act "as support to the first."

At the critical moment then, as far as numbers in the front line are concerned, the only difference between the reinforced line of skirmishers and the two-deep line will be, that in the former every man will be out of his place, companies will be mixed up, and the difficulty of control and command over the troops under fire will be enormous, if not insurmountable; whilst in the latter all the companies will be intact and in their proper places, and the control and command precisely as usual.

It cannot of course be denied that the two-deep line, when it approaches within easy rifle range of the enemy's position, presents a target which it ought to be easy to hit.

A direct attack however upon a determined enemy can never be made without heavy loss, whatever the formation in which it is made may be, and until it can be shown that in making such an attack, the loss incurred by troops in the skirmisher-swarm formation is so much less than troops in two-deep line formation, as to entirely compensate for the mixing up, confusion and want of control which the former formation entails, I consider any such radical change in our tactical formation is clearly to be deprecated.

It is of course impossible to lay down arbitrarily any system of attack or defence, which will be applicable to all circumstances and to all kinds of ground.

I submit, however, for consideration the following form of attack for a single battalion, in order to show if possible that not only as a target, but also as a tactical formation, the line is superior to the skirmisher-swarm.

In advancing under artillery fire, the line, having necessarily to adapt itself to the formation of the ground, must try as far as possible, when it has to break up its component parts, to do so in such a manner as will still only present a two-deep line as a target.

Thus, if the fire upon the line be direct, an advance in short échelon will give the requisite flexibility, and at the same time in no way offer a more favorable target. Should the fire come diagonally from one flank of the position, an advance in échelon from the opposite flank will meet the requirements of the case.

It must entirely depend upon the severity of the fire and the formation of the ground, whether the advance under artillery fire shall be

general and continuous, or whether it shall be made by a succession of rushes. In the latter case, each company in succession would run forward at speed to certain distance, and lie down, each forming up in line on the one which precedes it.

By this means the first 1,200 yards ought to be got over without much loss.

During the last 800 yards, however, the advance becomes really difficult, and every possible means must now be taken to diminish the effect of the enemy's infantry fire which sooner or later must now come into play.

Rapidity of movement and a formation offering the most unfavourable target possible, are excellent precautions against infantry fire, but would not be sufficient to ensure a successful advance. Now, as formerly, skirmishers must cover the front, and upon them must devolve the arduous duty of protecting and aiding the advance up to the moment when the final rush upon the position has to be made.

A position defended by breech-loaders is now so strong as to necessitate its being approached in a manner somewhat like that which is laid down for the escalade of a fort or for the storm of a breach. The fire of the defenders must be kept down by troops specially told off for the duty, and this duty must devolve upon the skirmishers.

Skirmishers should thoroughly understand that wild, unnecessary firing is worse than useless, as it does the enemy little harm, and tends to give him confidence.

A steady, well-directed fire, on the other hand, kept up upon every man that shows his head above the cover of the position, will nearly invariably produce its effect, and will certainly tend to lessen the value of the enemy's fire, and thus facilitate the advance of the attacking force.

In order to cover the front of the line in the most rapid manner possible, and at the same time to give the line itself greater freedom of movement, I would recommend for consideration and trial, that the requisite number of skirmishers should be sent out from each company, so many from each section. Their numbers must be regulated by circumstances, but the advice of Boguslawski should not be forgotten, viz., "that skirmishers sent forward should be in force from the beginning, as bringing forward reinforcements always occasions great loss."

No supports or reserves will be necessary, as the line will be close behind them, and they are not intended as an attack formation.

Skirmishers when used to cover the advance of a line, should in my opinion only take advantage of such cover as each man may find in front of him. There should be no diverging to the right or left, and every effort should be made to prevent the men getting into knots and clumps, which inevitably draws down a convergent fire. A single skirmisher lying down in the open has really less chance of being hit than if he form one of a group, as in the former position he does not attract any particular attention.

The manner in which skirmishers should advance is a very important consideration; it should be carried out in such a manner as to secure a continuous fire being kept up, and also to admit of that fire

being delivered by them from such a position as will offer the smallest possible mark to the enemy.

When skirmishers advance in one general line, they offer the most favourable target to the enemy's fire, and they themselves have no time to fire steadily and effectively. Such a formation is therefore only suitable when the advance is made without firing, or when skirmishers are opposed to very inferior troops.

An advance by alternate files is not much better than a general line, and under fire would soon become one.

An advance by alternate sections of companies is better, but the unit is so small as to render the general control of the skirmisher-line very difficult. Moreover the advance of alternate sections cannot be covered by the fire of the halted sections, as the spaces between are so small as to render such an attempt dangerous; the fire must therefore be kept up by the skirmishers of the most advanced sections, who, as in a general advance, will have no time to fire steadily and effectively except by diminishing the rapidity of their advance.

The same principle which I advocate with regard to larger bodies, holds good, I think, for skirmishers, viz., that they should be divided into as large an unit as can be conveniently controlled.

In this view I would recommend for consideration and trial, that the skirmisher-line covering a battalion should be divided into four parts, one of which should be always advancing, the next to it ready to advance, and the other covering the advance by their fire. For instance, the skirmishers being divided into four parts, numbered from the right, are lying down. The advance, followed by the Commence Firing sounds, No. 1 at once rises and doubles forward about 20 or 30 paces; No. 2 remains lying down; Nos. 3 and 4 commence firing. When No. 1 lies down, it commences firing; No. 2 rises and doubles forward in line with No. 1; No. 3 ceases firing; No. 4 continues to fire.

No. 3 then doubles forward, whilst Nos. 1 and 2 keep up the fire, and, if thought desirable, No. 4 can advance at the same time.

When the skirmisher-line is thus reformed, another advance should be made in the same manner.

By this plan a continuous fire can be kept up by *halted* skirmishers on a good portion of the enemy's line, during the whole advance, whilst each man will have plenty of time to judge his distance accurately, and to deliver his fire with a steady, effective aim.

The advance of the line in rear must be regulated by the progress made by the skirmishers, and by the amount of aimed or unaimed fire to which it may be exposed. The nearer it can remain to the skirmishers, however, the better.

The whole line can rush forward as a single body; or, when the enemy's fire or the ground does not admit of this, it can be advanced, as already explained, by half battalions, double companies, or companies.

It is, of course, impossible to say how near, by the above method of advance, the line will be able to approach to the enemy's position. Unless, however, the enemy is a very contemptible one, sooner or later the skirmishers will be unable to get on any further.

When this check occurs, the line must be brought up to the skirmishers, who will thus fall again into the ranks of their respective companies; a general fire will be opened by the line from a lying down or kneeling position, and preparations for the last rush on the enemy will have to be made.

A charge in line, over a distance of even 100 yards upon a position stoutly defended by troops armed with breechloaders, may almost be pronounced impracticable, unless efficient means are taken to keep down the enemy's fire, or at least to diminish its effect. It is possible, of course, that the charge would succeed, but the loss of life would necessarily be very great.

The problem therefore to be solved is how to cover the final rush by an effective fire.

This important duty should, I think, devolve upon the two flank companies of the battalion.

Whilst the fire of the line is kept up, they should be moved out diagonally to the right and left front, and placed in such a position as will enable a cross and oblique fire to be brought to bear upon the enemy. The formation of these companies must depend entirely upon the ground, and need not necessarily be in skirmishing order.

So soon as the fire of these companies has produced an effect, the line should cease fire, and again get nearer to the position by a succession of rushes, opening fire again directly it is halted. The two covering companies, if not already far enough advanced, will take this opportunity of creeping on nearer. By this means it is hoped that the troops may be brought up to within charging distance of the enemy, when, if he still remain, recourse must be had to the bayonet.

An advance by a succession of rushes was successfully adopted by the Germans during the late war. Boguslawski says:—"Meanwhile "the German line of skirmishers was approaching the enemy by a suc- "cession of rushes. This was either done by taking advantage of "cover, or else they would advance about a hundred paces at a run, "throw themselves down, and then run on again."

Such a modification of our line formation seems to me to grapple with the difficulties of a direct attack far more successfully than does the skirmisher-swarm. It contains all the necessary characteristics of a good attack formation, viz.:—

a. Simplicity.
b. As large an unit as can be conveniently commanded.
c. Fire under good control.
d. The possibility of straggling reduced to a minimum.
e. Most unfavourable target for the enemy.

Moreover it does not require the extraordinary training laid down as necessary to ensure the success of the skirmisher-swarm formation, viz., the organization and regulating of confusion; the bringing of order out of disorder.

Hear what the author of a "Tactical Retrospect" has to say on this subject, he who was the first to recommend the skirmisher-swarm attack:—

"Confusion followed as a matter of course upon these attacks in "loose order."

"This mode of fighting has an invariable result, the original depth "of the order of battle which consists of a support behind the skir- "mishers and a reserve behind these, is now superseded by a greater "extension of the front line."

"There is not even the smallest guarantee that a company will fight "together with the skirmishers, which it has itself thrown out, or that "the companies of a battalion, or the battalion of a regiment, will "ever come together.

"After a short time not only the advanced guard and the main "body, but also a part of the weak reserve was engaged in the front "line; and the companies were all mixed up with one another in the "greatest confusion. Without the slightest necessity, one company "after another was hurled into the chaos of the fight; very soon all "were swallowed up in the front line, and thus all power of movement "was lost." "When the Hanoverians at length attacked these weak "lines with superior force, that happened which was inevitable, they "were broken and their component parts driven back. No reserve was "at hand, and thus any rallying was impossible."

The system, in fact, seems based on the assumption that victory is a certainty; and I have not as yet discovered any one who has ventured to lay down how the agglomerated mass of skirmishers when defeated is to be brought off the field, with any prospect of rallying the troops again in their original formation within a reasonable time.

The following extract from the same author will show how *he* shirks the question:—

"But it may be objected that such tactics will make it very difficult, "after the battle, to re-assemble the troops thus mingled together, in "their proper corps and divisions. First, gain your battle, that is the "chief point, then it will be far easier to disentangle and collect your "men into their proper places than after it is lost."

Want of order, and consequent want of proper control; undue extension of the front line, and the impossibility, in case of defeat, of quickly re-assembling the scattered units, are thus seen to be a few of the drawbacks of the skirmisher-swarm formation.

Still more serious defects remain to be pointed out. I again quote from "A Tactical Retrospect"—

"If only all soldiers, of their own accord would simply do their duty "in battle, an army would be perfectly invincible, and would not require "any tactical instruction whatever."

"But man has in his composition a natural desire of self-preserva- "tion—who would ever maintain that death was indifferent to him!

"The greater number of the men go bravely into the fight, because "their common sense tells them that it must be so, that it would be "shameful to sneak off: if they cannot do so with a good grace they "make the best of a bad bargain."

There will always be some, however, he points out, who but watch the opportunity to remain behind—

"So long as the soldier knows that the eye of his officer is upon

" him, he instinctively feels the inspiration and willingly bows to it. But " in the supreme moment in which danger and death are imminent, sud- " denly this accustomed link is broken, the eye of his leader is directed " towards the enemy in the front, the troops hurry towards the fire; the " man sees death in his front and a nice road-side ditch by his side; it is " the temptation to a theft, he sneaks quietly into it, and his company is " soon far away from him.

" This sneaking off in all kinds of ways is by no means a rare " occurrence. It is chiefly by these kind of stragglers that such a " serious melting away of many companies in battle is caused."

" The same man who, while overlooked, bears himself bravely, will " fall off when left to himself."

If this statement of the case be equally applicable to British as well as to Prussian troops, and I fear that none who have been in action will attempt to deny it, then it follows that any system by which the supervision over troops under fire is diminished, must tend to lessen the chances of success.

Encouragement of straggling, therefore, may also be added to the other disadvantages of the skirmisher-swarm formation.

The last but not the least objection which I have to bring against the skirmisher-swarm formation, is the necessity (produced by the undue extension of the front line), which is entailed upon the artillery, of firing over the head of the advancing troops almost from the very commencement of the attack. As the writer of Essay No. IV says:— " In firing over the heads of infantry, one shell bursting short amongst " the men tends more to demoralise them than fifty shells from the " enemy bursting in the same place would do. The confidence of infantry " in their artillery, which it is most essential to encourage, is ruined by " one or two accidents of that nature."

Firing over the heads of infantry should be the *rare exception*, not the rule, and should only be permitted " when artillery has already got " the range and from personal observation knows the points of the " ground in the enemy's fronts, which are endangered by it. When the " infantry approach those regions, the fire should at once cease."

I have thus enumerated the disadvantages which the several advocates of the skirmisher-swarm formation themselves must admit that it possesses.

Even amongst the Germans there is still considerable difference of opinion as to the formation best suited for attack, and in a work only lately translated from the German by Colonel Edward Newdigate, called " Experimental Tactics of (Prussian) Infantry in the year 1872," it appears that the line formation is mentioned as preferable to the column against artillery fire; and as a very appropriate formation for troops *when stationary!* " under the enemies' fire in case the ground " offers no cover!!"

The following passage also occurs in " A Tactical Retrospect:"— " It must be most distinctly understood that these loose irregular " formations which we have here alluded to, are not to hold good on all " occasions and in all circumstances. So long as an officer believes

" himself to be in a position to gain the same results by keeping to the " systematic forms of the service, he is quite right to do so."

In another well-known German pamphlet, entitled " On the Prussian " Infantry 1869," the following passage will be found:—

" In order to attack a position defended by breech-loaders, two " points must be taken into consideration; first, how to pass over the " distance of from 400 to 50 paces before the enemy, without being " annihilated; and secondly, how, under the circumstances, we may be " enabled to have the troops well in hand, in close order, at the moment " of the shock. The skirmisher-swarm attack might, perhaps, answer " for the first point of view, but decidedly not for the second."

Another authority on the late war, viz., the Duke of Wurtemberg says:—" One must, however, be cautious in drawing conclusions re- " garding the possible result of tactics in the future from what the " Prussians succeeded in doing."

It is evident that the adoption of the skirmisher-swarm formation was, as it were, the inspiration of the moment, forced upon the Prussians by the terrible loss which they suffered at St. Privat, when advancing according to the regulations which at that time held good. Success, one must remember, is apt to mislead, and it seems to me that superior numbers, entire disregard for loss of life and the faults of the French, had probably much more to say to the victories of the Germans than the tactical formation by which they were won.

Until, however, this moot point be decided, and the " individualised " method of fighting " be either authoritatively laid down for guidance or definitively rejected, it would seem well to consider how we can instruct our soldiers under our *present* system; so that if an European war were to come upon us suddenly, we should not be utterly unprepared to meet the altered requirements of the day.

It seems to me that it would be well to draw a broad line between the mere mechanical drill of the company and battalion, as laid down in our Field Exercise book, and its practical exemplification when troops are supposed to be moving under fire.

The one should be called Drill, the other Manœuvring.

When at drill, no skirmishers should be sent out to cover the movements, this should be reserved entirely for manœuvring.

There would, of course, be skirmishing-drill, as well as battalion-drill, but no combination of the two.

I attach myself the very greatest importance to steady drill, and consider that now, more than ever, it is essential not to neglect it. I cannot do better than quote in favour of this view, the words of a General Officer, who has been an eye-witness of the success of the Prussians in the campaigns of 1866 and 1870-71. He says:—

" Careful and accurate drill during peace is the best preparation for " celerity and steadiness in war:" " more than half the movements in " the best and most simplified drill book have no greater practical value " than to make the men ready, perhaps to provide for a case which " may arise once in a century, and to practise Officers in giving words " of command." " If all Officers and men were equally intelligent " and perfectly cool under fire, it might, perhaps, be sufficient to drill

" them only in such movements as would be used in the field. But " they are not; therefore careful and elaborate drill cannot be dis- " pensed with, *and those who think that because many field movements " are not, and cannot be practised, under fire, they therefore ought not to " be practised in peace or on the drill ground, are in my humble opinion " very much in the wrong.*"

I feel sure that the sound common sense contained in these few lines will carry conviction home to every soldier who has thought over the matter, and who may, perhaps, be doubting somewhat whether so much attention to drill minutiæ is really necessary.

With respect to manœuvring the same General says :—

" The German system, however, is well worthy of our imitation so " far as general principles are concerned. To quote the words of an " Officer who was present in the field during the late war,—'actual " ' movements in the field as done by the Germans, are always as " ' simple as possible, being guided by two common sense rules, to get " ' to the place where you are wanted as quickly as possible, and in " ' the simplest manner possible.' "

When a company or battalion is manœuvring, every movement should be made as if in presence of an enemy. The position of the latter should be pointed out, and if marked out by flags or by a few skirmishers, so much the better.

In the attack of the future, skirmishers must necessarily play a most important part. They should be made, therefore, to fully understand the purpose for which they are sent out, and the necessity of moving forward with the least possible exposure. When firing, they should remember that quality not quantity produces the most effect.

Skirmishers must never be recalled in order that the line may open its fire. The latter must move up to the former. They must be accustomed to move without sound of bugle. The words of command must be conveyed along the whole line by the Officers and non-commissioned officers. Troops in line when halted should at once lie down. Firing and loading should be carried out in the position entailing the least exposure to the enemy's fire, and the more especially when at easy shooting distance from the enemy's position.

An advance in line against a position defended by breech-loading arms and within easy range of them, must be looked upon as almost hopeless, unless it can be covered efficiently by the fire of special parties told off to keep the enemy's fire down. The fire of the flank companies, as I have already said, appears to me the best solution of this difficulty.

By some such means, and by many others which will no doubt suggest themselves to Commanding Officers of regiments, infantry may be at once taught to move in the manner, which will insure a minimum of loss under the fire of modern artillery and breech-loaders.

The separation of drill from manœuvring will, I feel sure, produce the most beneficial results, and will do much to prevent the somewhat absurd situations which now too often occur when a combination of the two is attempted.

Whilst I have thus endeavoured to prove that no radical change in

the tactical formation of our Army is really required, I have, I trust also clearly indicated the important changes in the movement of our troops when under fire, which I consider necessary.

Those changes, however, are simple and easily understood. They are merely an extension of our present drill, and do not entail the study of an entirely new system. They appeal to the intelligence of the soldier, and are calculated to give him an increased interest in his profession; and last but not least, they will enable us to retain, in spite of all the changes in modern warfare, that two-deep line formation for attack, which the British Army has always looked upon as peculiarly its own.

PRACTICAL METHOD OF FINDING A SHIP'S METACENTRE AT GREAT ANGLES OF INCLINATION.

THE accompanying paper has been written at my request by Mr. Blom, the Chief Constructor of the Norwegian Navy.

Its great importance will be recognised at once.

When ships were constructed with high sides and unarmoured, the importance as regards their safety, of ascertaining their stability, both when they existed in design, and afterwards when the position of their centre of gravity had been ascertained *experimentally*, was not great; but now no class of gun-boat, however small, no class of ironclad, however large, is allowed to go to sea until the curve of stability, of one sample at least, is ascertained. Hitherto the calculations have necessarily been very lengthy. In evidence given at the Court-martial on the "Captain," it was stated on the best authority,—that of Mr. Barnes, to whom we owe the investigation,—that it required a whole month for two experts to complete the calculations. It will be remembered that Mr. Laird had the moment of stability of the "Captain's" design calculated for one angle of heel only (10° I think) before the ship was constructed. Had so short and simple a method as Mr. Blom's been known to him then, it is pretty certain that he would have had it calculated for other angles as well, and then, that the "Captain" would reach her angle of maximum stability at 23°, and lose it entirely at 54°, would have been disclosed. This startling fact would have led no doubt to the ship being tested to ascertain *experimentally* the position of her centre of gravity *immediately* after her arrival in a Government dockyard; and if the previous calculations had been confirmed, she would probably have had her masts removed or reduced to a jury rig.

I mention the above to prove what a boon Mr. Blom has conferred upon naval constructors and upon those who "go down to the sea in ships." His modesty has prevented the introduction of his method to the world before now. He mentioned it casually to me when I professionally visited a few weeks since the Royal Dockyard of Horten in Norway. The curves of stability of the Norwegian monitors and converted gun-

boats have been ascertained in this way and its accuracy tested by comparison with the results of the vigorous but very lengthy method.

ALFRED P. RYDER,
Vice-Admiral.

Having had to calculate the curve of stability of ships of rather peculiar forms, such as monitors, according to the plan of John Ericson, I have found the regular way, described by Mr. Barnes in the Transactions of the Institution of Naval Architects, less serviceable on account of the want of continuity of the transverse sections of the ship, besides being very laborious; and I have been induced to use a different way for finding the metacentre, or rather the statical stability of a ship for angles of inclination, where the metacentre may not any more be supposed the same as in the upright position of the ship.

The problem of finding the metacentre at a given angle of inclination is solved, if only the movement of the centre of buoyancy of the ship in a direction parallel to the inclined water-line, is known. This is what I find in the following way:—

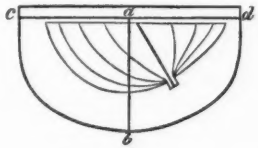
I at first determine the position of the inclined water-line of the ship in the body-plan by first drawing it at guess so as to make, according to eyesight, the immersed and emersed wedges equal, and afterwards correcting it by calculating the immersed and emersed volumes and dividing the difference between them by the area of the inclined water-line; the quotient giving the quantity the assumed inclined water-line is to be raised or lowered, according as the emersed or immersed volume is in excess.

To make the last-named calculation in the easiest way, I measure the immersed and emersed areas of each cross-section, either by a plain-metre or by a transparent paper of squares; then take the sum of the immersed and of the emersed areas separately, subtract one from the other, and divide the difference by the sum of the breadths of the supposed inclined water-line at the different sections, taking only one-half of immersed and emersed areas and of the breadths of the inclined water-line *at the end stations*, if these may not be altogether neglected as they generally may; the quotient is the above-mentioned correction in the height of the inclined water-line.

I next have a set of models of the different transverse sections of the ship, drawn in the body-plan, cut out in paper. The paper models are carefully put on the top of one another with their middle line and upright water-line corresponding, and then secured together by a light stitch of thread in two places. The inclined water-line is drawn on the top of the parcel, which is then cut in two through this line, the lower part representing the displacement in the inclined position of the ship.

I now find a line $\perp$ to the inclined water-line, in which the centre of this displacement is situated (viz., the centre of buoyancy in the inclined position) by balancing the parcel on a horizontal, sharp, straight edge, *a*, *b*, placed at right angles to a vertical plane, *c*, *d*, as shown in the adjoining sketch. When the position of equilibrium of the parcel on the edge, *a*, *b*, is found, keeping the inclined water-line parallel to *c*, *d*,

the position of a, b is marked on the parcel by pressing it hard against the edge; the line, a, b, is then transferred to the body-plan, by putting the parcel of paper models on the top of it, and prolonged till it intersects the middle line in the metacentre. When the centre of gravity of the ship is marked in the body-plan, its perpendicular distance from the line a, b at once gives the lever, on which the weight of the ship is acting to right or upset the ship, and these levers for different inclinations are the ordinates of the now generally known *curve of stability*.



It will be seen that the correctness of this method is founded on two conditions, viz., 1stly, that the centres of gravity of the paper models coincide with their centres of figure; and 2ndly, that the weight per square unit of the different models, is the same. I have found that common drawing paper can be had of sufficient uniformity to fulfil these conditions with the degree of exactness required for practical purposes. It will further be seen that the method is an application of the trapezoidal rule for calculating the centre of gravity. To make this rule sufficiently correct, I generally divide the length of the ship into 16 parts, which gives 15 intermediate sections, besides the two end sections which are neglected.

I have by experience found the above-described method to give a sufficiently exact result, when it is executed with neatness; it has the advantage of saving a great deal of mental work and of time. As soon as the inclined water-lines, corresponding to the different angles of inclination, have been determined, the process is only a mechanical one. The figure of the sections may easily be pricked through from the original body-plan, cut out and put together by a number of assistants so that in one or two days the curve of stability can be got out.

TH. A. BLOM.

Norway, June 1873.

THE BATTLE OF WÖRTH.

6th August, 1870.

By Lieut. E. H. H. Collen, R.A.

(Staff College Prize Essay, 1872.)

Preliminary Observations.

If it be neither necessary nor desirable to enter upon a lengthy disquisition concerning the political history of the Franco-German War of 1870–71, we cannot afford, on the other hand, to neglect the salient points of the attitude of the belligerent powers prior to the declaration of war.

The plan of any great military operation is invariably dependent upon political considerations. This is the true key to nearly every military problem of any rank in the history of the world, the solution of which has been attempted by war.

The military writer, therefore, who desires to study and depict the operations of war in their greatest breadth of outline, must obviously endeavour to grasp the political situation of the warring nations, in order that he may form a judgment on the strategical plans, and on the power of either side to take the initiative in the campaign.

Beyond this, he must make himself acquainted with their military systems and resources. In attempting this difficult task, we feel ourselves still dazzled by the bright light of the great events which seemed to flash past us, in a course so vivid as to outrun history.

The war of steel and shot has been followed by a war of pamphlets, and the military student who tries to gain information concerning the political basis of the war, recoils at last, wearied out by accusation and counter-accusation, only finding relief in that portion of the mass of writing, which treats of the military systems of France and Germany, and where each side agrees in condemnation of the former and laudation of the latter.

Political Considerations.

On the one hand, we are told that the Germans are a peace-loving people; and that the sudden uprising of their armed million only

demonstrated the greatness of the quarrel which was forced upon them by an unjustifiable pretext.

On the other, we learn that no one in France really desired war: that each General (except the Minister of War) knew the weak points in her armour; that the ancient foe of France gladly seized the opportunity offered by bad diplomacy to put her in the wrong at the outset, and that France, unable to bear the passive insolence of Prussia, was, in the interests of national honour, obliged unwillingly to throw down the gage of defiance.

Are we able to determine upon whom rests the responsibility of entering first into the terrible lists where Death stands the arbiter?

The calmer judgment of future time may be able to reply.

It will be sufficient for us to express the moderate belief, that blame rests upon both the Governments of France and Germany.

In the one country, war was desired by a party, which saw in successful military enterprise, the only way out of the difficulties entangling an Imperial Government. The old cries of "national frontier," and national honour were raised, the military passions of the dominating Parisians were inflamed, and the more moderate and peaceful counsels of those who shrank from an appeal to arms, were drowned in the shouts of mistaken patriotism.

In the other land, a great statesman had long been preparing for the struggle which he foresaw must come to pass between two great military powers, both possessing enormous armaments, and both desirous of holding the reins guiding the destinies of Europe. A military despotism was to be maintained and propped up by military success; while the liberal ideas, beginning to undermine the system which has of late years placed Prussia among the foremost nations of the world, were to be thrown back, and yield themselves captive to the fascinating temptation of martial renown. The dream of German unity was to be realised, and parties and peoples were to be bound together by ties more potent than those of ordinary commercial and political interest. The memories of past oppression were to be invoked, and the divisions of the German race were to be united against the common enemy.

On the French side, since the time war had been tacitly determined upon, if openly disavowed, the probable demeanour of the South German States was anxiously canvassed. Upon this demeanour hung the French plan, conceived under mistaken belief both of the behaviour of those States, and of the power and accuracy of organisation, which would enable France to seize the advantage of the initiative and carry war into the enemy's country.

Every indication, military or political, shows us that offensive war was intended, and that the original idea, was the passage of the Rhine, the separation of Southern from Northern Germany, and the assumed consequence, alliance with Austria and Italy.

We are told in a pamphlet which bears the stamp of authority, that this plan was to compensate for inferiority of numbers; and its audacity of conception might command our admiration, if it had been accompanied by a just appreciation of the military power of the foe.

But the political basis was insecure. No real grounds existed for the belief that the South German States would remain passive spectators of the invasion of their soil, or would unite with France against Prussia.

In 1866 the South German States had been hostile to the cause of Prussia against Austria. The Peace of Prague, however, accomplished great things towards German unity. The retirement of Austria from interference in the government of the German States; the abolition of the Diet; the great strengthening of the hands of Prussia by the annexation of Hanover, Hesse-Cassel, Nassau, and Schleswig-Holstein; the formation of the North German Confederation, and the *military subordination* of the armies of the South German States to the King of Prussia, should war arise; all combined to work together in the direction so much desired by a large party in Germany. The Customs treaties, and the various commercial relations subsisting between North and South Germany were enlarged. In a word, the military domination of Prussia was established, and in a manner which rendered a large party desirous of binding themselves in a great German Confederation, at the head of which should stand the power of Prussia.

It is difficult to believe that the course of events in South Germany could have been watched closely by French diplomatists, if we credit the statement which affirms, that up to the last moment the French Foreign Office believed that the South German States would join the invader, and prefer to fight or passively acquiesce, in the struggle, in military subordination to a foreign and alien power, rather than make common cause against the common enemy.

The spirit of peoples is but the embodiment and gathering up of that which animates individuals, nor did it require a profound knowledge of human nature to determine that the balance of probability lay on that side of the political argument, which asserted that the South Germans were more likely to unite against a foreign than a domestic foe.

The French Army.

In the French Army matters were scarcely in a good state for opening a campaign. The lines of demarcation between Officers and men had been gradually softened, and the bonds of discipline relaxed. The minds of the thinking Officers of the French Army, were unsettled in regard to the many important questions in tactics which the changes of late years have brought forward; and this want of stability naturally reflected itself upon the great masses of the men. A system of enlistment which did not give sufficient men for the reserve, and the dependence upon a huge untrained levy, the Garde Nationale Mobile, united to hinder the production of a military force adequate to a struggle with Germany.

In 1866 the reorganization of the Army had been commenced by Marshal Niel, and the new law of recruiting was a vast improvement on the Army systems successively inaugurated by Gouvion St. Cyr, and

Marshal Soult in 1818 and 1832, which had hitherto obtained as the basis of martial preparation.

The change became law in February, 1868; but after the death of Marshal Niel in August, 1869, the reforms were carried out in a feeble and perfunctory manner. Still, something had been accomplished, and public opinion was ready to applaud and be satisfied by the wonders which the Chassepôt was to work in future war, while the mysterious mitrailleuse was accepted as a great military discovery which might revolutionize tactics.

Few, moreover, cared to look into the dry details of military organization. *The French system was one which required time to develop its strength.* Brigades and Army corps were not maintained in a form which admitted of easy transition to a war-footing. In 1870 two corps alone, those of the Guard and of Chalons, were embodied. Neglecting the natural plan of localization, and territorial distribution, which the Prussians had adopted, the outbreak of war brought with it the necessity for absolute reorganization, a vastly different matter from the process of "mobilization." Men had to go long distances to join their corps, and the depôts for equipment were in some cases far from the points of concentration. The military resources of the country were centred at Paris, Lyons, Marseilles, Metz, and Strasburg; the magazines were in the front line of danger, and further than this, the power of applying these resources was wielded by a distant authority at the War Ministry.

Military Administration.

The civil administration of the Army swells the list of defects in the French military system. It would, however, be most unphilosophical to follow the cry which rejects everything French as worthless, and extols the military preparation and feats of arms of their adversaries in blind admiration. We had long looked to the French system as the perfection of military organization. The War Ministry of France was held up as a model to be copied in Pall Mall. The smoothness and regularity with which all was worked, were commented upon, and we were shown how excellent was *the concentration of the whole military business of the country under one single head.* The Corps de l'Intendance Militaire was deservedly admired, and the views held by some of our most able Officers were very favourable towards the French system. And not without reason; the Intendance had done excellent service in Africa, the Crimea, and in Italy; the Officers were men, for the most part, of capacity and activity, selected for their talents, and enjoying high consideration. The Transport Service, represented by the Train des Equipages Militaires, was well organized, and had received considerable commendation from independent criticism. Officers of the British Army were, however, not wanting to note defects in the system.*

* See note by Col. Claremont, C.B., Military Attaché at Paris, in Lord Strathnairn's Committee Report, Transport and Supply, 1867, and evidence of Sir G. Balfour.

The one grand defect was *over-centralization*, and the *attraction* of work to the War Ministry which should have been decided locally. Apart from the influence which is said to have corrupted some of the employés of Government, we believe it will be found that the above is the key to the French failure, and the defects of the *personnel* of the Intendance were comparatively minor.

In peace-time, business flowed quietly through the "proper channel," was received into the official mill, and after receiving "due consideration," was diverted into the course which led to ultimate action being taken in the matter. The machinery was well oiled, much trouble was saved to subordinates, and the power of the War Ministry was increased. But when the rude trial of war came, the machine was worked to its highest pressure, the channels were choked to repletion, and the machinery was thrown out of gear.

No greater lesson can be presented to the minds of the present generation in the absolute dependence of all modern war, upon military administration. The military business of the country was centred at Paris; for every work a Ministerial order was necessary, and the wise remark of Marshal Bugeaud was neglected or unheard: "On perd de "vue dans la paix les exigences de la guerre, et on fait les armées pour "la paix."

It has been asserted that the French Generals were not good military administrators. If they had been, their efforts would have been fruitless, for under the present conditions of warfare, time does not allow for reorganization.

Such may be held to be some of the reasons why France was enabled only to bring about 200,000 men in front line against the crushing masses of her adversary, while she had at the utmost only 300,000 trained and disposable troops. But France and her Government had received warning. Niel, Thiers, and Trochu had lifted their voices in vain. Stöffel had explained the German system with exhaustive ability, and had clearly pointed out the disadvantages of the French system in comparison with the merits of the German.

These men laboured to disabuse the popular mind of its blind self-confidence, and the prophetical writings of Trochu and Stöffel stand a monument to the folly of military vanity in past glories. They were passed by in silence and indifference, or treated as coming from dangerous disturbers of the peace.

If the Emperor Napoleon III was not desirous of entering upon the war, and we may well believe it, he must yet be held responsible for the culpable ignorance shewn by his War Minister, Marshal Le Bœuf. It was soon to be found out how even the military qualities of the Empire were disastrous failures. In brief, the Empire may have been peace,* it certainly was not war.

The German Army and its Military System.

If we examine the military system of Germany, we find it possessing those attributes and qualities in which that of France was deficient.

* "L'Empire c'est la Paix."

Strict discipline, strong distinctions between officer and private, a high military education for both, large reserves of trained men, the development of individual intelligence combined with the cohesion of the single forces constituting martial power, and, above all, a decentralisation in administration and organisation, appear to be the leading features of the system, which, judged by the standard of success, seems to have closely approached human perfection. If the subject of this essay were the military organization of Prussia, it would be necessary to turn to the pages of history, and trace the growth of a system whose seeds were sown in the bitter experiences of Jena and Auerstadt, to bear fruit in the triumphs of 1866 and 1870–71.

Time, however, is wanting for this purpose, nor can we do more than touch upon the principles of that organization which, as has been well said, has made, not so much an army for the nation as a nation for the army.

The standing army of Prussia consists of the Active Army, the Reserves, and the Landwehr, and in this order denotes the passage of the army contingent taken from the population; from the one portion of the whole force to the other during the twelve years of service. Very curious ideas were entertained in this country with regard to that section of the force called Landwehr, and we were bid to look abroad and see what could be effected by a militia, the moderate objection to the employment of the term "reserve," instead of "auxiliary," (an objection now officially recognized,) being placed to the account of professional jealousy.

The territorial division of Prussia and its dependent States, the formation of corresponding army corps, each tactical and administrative unit complete in itself, the power of mobilization obtained by the system, have become familiar to us, and need no consideration in this essay.

In Prussia all interests are subordinated to military development. Mars and not Plutus is the god of society, and the sacred enclosure may more easily be entered by the steel than by the golden key.

In all the various branches of industry applied to war, Germany was well prepared for the great campaign. A country largely productive of grain, she has within herself the staple of human subsistance. The breeding of horses for military purposes is carried on, and under the army-corps system, the various essential requirements in *matériel* are procured, stored, and issued with facility. In administration as in tactics, the commanders of these corps are treated as responsible beings in whom a great trust is confided, and they are *educated up to that responsibility*, which is not fettered by central authority, nor confused by the countless orders of a directing power ignorant of local requirements, and, as in the case of the French War Ministry, oftentimes framed on knowledge obtained in theoretical official minutes.

In the war of 1866, Prussia had marshalled her forces victoriously against a powerful foe. She took counsel upon the errors and defects which were then displayed, and her able head-quarter staff, endeavouring to crush outside criticism by the weight of authority, were yet wise

enough to profit by the advice which they appeared to neglect and despise.

The foregoing are some of the features, and which can merely be indicated in this essay, of that system which has for sixty years formed the study and care of successive soldier-statesmen in Prussia. Wrought by years of toil, springing from national disaster, it has been gradually elaborated until it has reached a point high enough in the scale of destructive perfection to command the deepest adulation of its friends, and the unwilling admiration of its foes.

The Military Topography of the Theatre of War.

To comprehend, with any degree of accuracy, the military operations of the whole or part of any strategetical plan, it is necessary, beyond an acquaintance with the political situation of the hostile countries and the organization and power of the opposing Armies, to master the *terrain* upon which those Armies are to meet. It will be right, therefore, to obtain an accurate view of the nature of the country, the mountains, rivers, communications by rail and road, and the fortresses situate in the theatre of war. We shall then be in a position to speak with some confidence upon the bases of enterprise, the lines of communication, and the general plans of the respective Staffs, and further to discuss the strategical and tactical situation of that fraction of the French Army which forms the especial subject of this essay.

The frontier which separated the two countries may be taken as extending from Sierck on the Moselle, in a S.E. direction to Lauterburg, near the Rhine, thence by the course of the Lauter to the former river, and by the Rhine in a S. direction as far as Basle. On the N., extension for purposes of invasion is barred by the neutral territory of Luxemburg. On the S. by Switzerland.

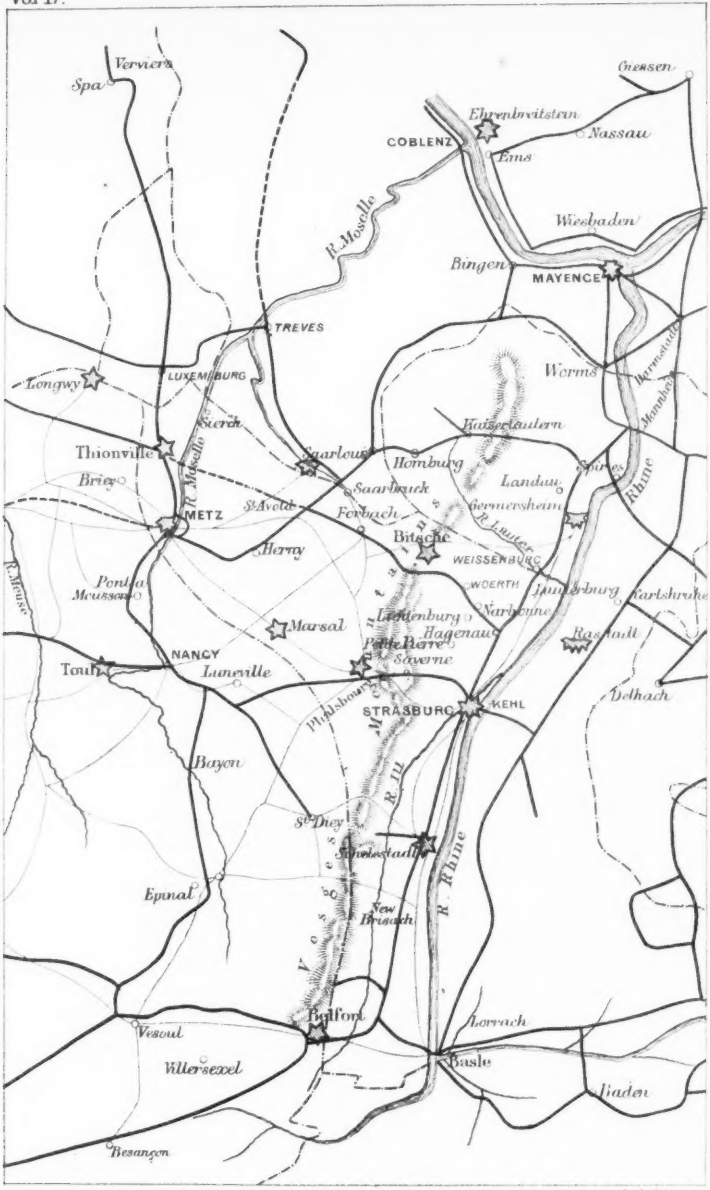
The frontier, therefore, was *re-entering* for the German side, and *salient* for the French, the apex of the angle being at or near Lauterburg. We shall presently have to remark upon the advantages this form of frontier conferred upon the Germans.

In geographical terms the theatre of war was, in the first instance, comprised by the basins of the middle Rhine and the Moselle, separated by the water-parting line of the Vosges mountains.

The basin of the Middle Rhine may be taken to mean the country drained by the course of the Rhine from Basle to Wesel. But for our purposes we must be content with that portion which lies on the left bank as far as Cologne.

The left portion of this basin is hemmed in by the Vosges Mountains, which speaking roughly run parallel to the Rhine, and extend from near Belfort to the Donnerberg (Mont Tonnerre), W. of Worms, there separating into the two branches, the Hardt (in which is Mont Tonnerre), in Rhenish Bavaria and Hesse, and the mountainous country between the Rivers Nahe and Moselle, known as the Hunsdruck and Hochwald.

Numerous small streams which rise in the Vosges, flow into the Rhine after a short course and are not strategically valuable as defensive lines, but rather as avenues of approach from Germany. In their course


Verviers
Spa
Coesfeld
Ehrenbreitstein
COBLENZ
Nassau
Ems
R. Moselle
Wiesbaden
Bingen
MAYENCE
TREVES
Worms
Darmstadt
Mannheim
Longwy
LUXEMBURG
Sierck
Kaiserslautern
Thionville
Sarrlouis
Homburg
Spires
Rhine
Briey
Saarbruck
Landau
St Avold
Forbach
Germersheim
R. Lauter
METZ
Bitsche
R. Moselle
Herny
WEISSENBURG
Pont à Mousson
WOERTH
Landsberg
Carlshrhe
Marsal
Lixheim
Narbonne
Hagenau
Rastadt
Petite Pierre
Saverne
NANCY
Toul
Luneville
Delbach
STRASBURG
KEHL
Ph. Abbaye
Bayon
St Dey
Schlestadt
R. Ill
R. Rhine
Epinal
New Brisach
Belfort
Vesoul
Villersexel
Basle
Lorrach
Baden
Besançon

near the Vosges, however, they offer tactical positions in advance of the passes through which they flow.

In the S. portion of this basin, the streams from the Vosges flow not into the Rhine, but into the River Ill, which is a tributary of the greater river, rising S.W. of Basle, and flowing in a somewhat parallel direction until it enters the Rhine above Strasburg.

The first stream of any importance is the River Zorn which, rising in the Vosges, runs by Saverne, and unites with the River Moder, which latter also rises in those mountains, receiving several streamlets, and washes Hagenau, both entering the Rhine in one stream near Drusenheim.

The next is the *Lauter*, which, rising in the Vosges, flows near Pirmasens, Weissenburg, and Lauterburg.

The more northerly rivers, Rhine tributaries, need not be mentioned here. In many cases they mark the course of roads which would be used in an invasion of France from Germany.

The Rhine itself is an important military obstacle of which the Germans held the main issues, while those in possession of the French on the S. portion were neither so numerous nor strong. Beyond this, the issues on the French side conducted only, that is directly, into the difficult and mountainous tract known as the Schwarz-Wald or Black Forest, and its continuation. *On the other hand the German issues of Coblentz and Mayence turned the line of the Vosges Mountains.*

There were permanent bridges of boats at Strasburg, Fort Vauban (a ruin), Germersheim, Spires, Mannheim, Worms, Mayence, Coblentz, and Cologne; and railway bridges at Strasburg, Mannheim, Mayence, Coblentz, and Cologne.

The basin of the Moselle, itself a tributary of the Rhine, is formed on the E. by the Vosges, and on the W. by the Mont Faucilles, the Monts de la Moselle as far as Toul, and the Argonne and Ardennes' hills, which to the N. join the Eifelgebirge, whose E. direction compels the Moselle to enter the Rhine at Coblentz.

On the right bank the tributaries of the Moselle are of considerable size, on the left they are unimportant.

The Moselle rises on the W. side of the Vosges near the highest point of those mountains, the Ballon d'Alsace. It has a tortuous course of about 286 miles, with a mean breadth in France of 240 ft. It washes Remiremont, Epinal, Toul, Frouard, the junction of the Paris, Metz, and Strasburg railways, and where the River Meurthe joins the Moselle, Pont-à-Mousson, Metz, Thionville, and Sierck, at which latter point it leaves France. The Moselle forms a base of enterprise for France for offensive purposes, or a line of defence; but it is too far advanced as a base of defensive operations.

Its principal tributaries on the right or east bank are the River Meurthe, which rises in the Vosges, and passes by Nancy, the Seille rising in a long W. spur of the Vosges, and flowing by Marsal to Metz through a marshy country; the Sarre also rising in the Vosges, running past Sarreguemines (Saargemünd), Sarrebruck, Sarrelouis, and Sarreburg, entering the Moselle near Trèves.

The Vosges Mountains extending, as has been mentioned, from near

Belfort to the sources of the Lauter where they divide in a N.E. and N.W. direction, have a length of about 170 miles. The most difficult part of the chain lies between the Ballon d'Alsace, about 4,000 ft. high, to Mount Donon, which has an altitude of 3,200 ft.

These Southern Vosges are densely wooded, wide, and are a more serious obstacle to military operations than those of the north. The chief roads of this S. section, are:

1. Epinal, Mulhausen by the defile of the Moselle.
2. St. Dié, Colmar by the pass of Bonhomme.
3. St. Dié to Schelstadt by the defile of Ste. Marie-aux-Mines.
4. St. Dié to Strasburg by the defile of Schirmeck.

The N. Vosges, above Mount Donon, are less mountainous in character, but are much wooded and broken up by ravines. The E. slopes are more difficult than those of the W., and the width of the chain in the N. portion is not more than 20 miles on an average; the S. mountains having a breadth of about 30 miles.

The N. portion terminates in the hilly country, the Hardt, trending towards Mayence; that of the N.W. towards the Moselle, and ending near Coblentz.

The Northern Vosges (above Mount Donon) more immediately concern us, and we must examine more closely the communications across. They are:—

1. Saarburg, Phalsburg, Saverne, Strasburg, by the pass of Phalsburg.
2. Hagenau to Bockenheim (Saar-Union) by the pass of Lützelstein (la Petite Pierre).
3. Hagenau to Saargemünd by Lichtenberg.
4. Hagenau and Weissenburg, Niederbronn, Bitsche, Saargemünd by the pass of Bitsche.
5. Landau, Zweibrücken (Deux Ponts).
6. Kaiserlautern, Mannheim.
7. Saarlouis, Kaiserlautern, Mayence.

Besides these main roads there are numerous smaller country roads and tracks. It may be convenient to remark in this place that the roads in this part of the country, even those known as secondary and field-roads, and not main *chaussées*, are remarkably good, and easily traversed by all arms.

With regard to the passes themselves, they offer good positions for the construction of field-works, and the retardation of a superior force by an inferior one. While no absolute defence could be made for any length of time on account of the bye-roads and tracts leading over the mountains, the main *chaussées* could easily be blocked so as to afford time to a defending army to concentrate at any point in rear of the mountains. The passes over the N. portion of the Vosges are on an average about 1,000′ above the sea, so that their height above Alsace would vary from 600′ to 800′.

On the E. of the Vosges lie the plains of Alsace stretching to the Rhine, undulating and intersected by the streamlets of the Vosges flowing towards the great river. The country is wooded, but in many parts open, and rich in cultivation.

On the W. of the Vosges the hilly country of Lorraine extending towards the Meuse, has an altitude above the sea two or three hundred feet superior to the plains of Alsace.

The roads E. of the Vosges traverse these mountains E. and W., affording communications between France and Germany, or between the basin of the Rhine and that of the Moselle. E. of the Vosges they are connected by the main *chaussées*, Mayence, Landau, Hagenau, Strasburg, and Mayence, Spires, Lauterburg, Strasburg.

On the W. side of the Vosges, the roads direct on Nancy and Metz, while more northerly in the lower valley of the Moselle the roads are difficult, and on the tops of hills.

The railroads are as follow:—

On the N. and W. of Vosges—

1. Metz, Forbach, Saarbruck.

Whence lines diverge to Trèves, to Bingen on the Rhine, and by Homburg viâ Kaiserlautern to Spire, Mannheim, and N. to Mayence, connecting also with Germersheim S.

2. Metz, Sarreguemines, Bitsche, Hagenau, Strasburg.

3. Metz, Nancy, Luneville, from whence a railway branched to St. Dié; the main line from Paris running viâ Brumath to Strasburg.

4. Metz, Verdun, and Paris line. The portion from Verdun to Metz was not finished.

Hagenau, Weissenburg, Landau, Spire were also connected by rail.

5. Nancy was connected with Paris, and also viâ Epinal with the S. of France.

6. Strasburg, Colmar, Mulhausen, Altkirch, Belfort.

7. Metz and Nancy were connected on the left bank of the Moselle. The last section of this part of the subject is the *fortresses*.

On the French side, the country between the Vosges and the Rhine, Strasburg is the only fortress of any importance, as the others may be neglected. The Fort of Bitsche is naturally strong and commands the road, but it is commanded with modern artillery from neighbouring hills. The Forts of Lützelstein and Lichtenberg either lie off the road or are of too ancient a date. The Fort of Phalsburg lies $2\frac{1}{2}$ miles off the line of railway, and is too small to possess any power of attraction. Passing to the line of the Moselle, we find Toul, Metz, and Thionville the fortified points. Of these, Toul was of no great strength, and is commanded on all sides. Metz was a first-class fortress, containing schools of artillery and engineering, arsenal of construction, gun foundry, powder works, laboratory, and, in fact, all the manufacturing establishments necessary for the supply of all *matériel* of war and equipment to an army in the field. Protected by a very strong *enceinte*, one of Cormontaigne's greatest works, and through the ditches of which the Moselle flows, it was to be rendered a vast entrenched camp, by the construction of detached forts. These, however, were not all finished, and the connecting and minor forts were altogether wanting.

Thionville was only important as a *tête-de-pont*.

On the German side, we see the issues of the Rhine in its lower, middle course held by the great fortresses of Cologne, Coblentz, and

Mayence. On the more southerly portion, Rastadt is the only place of importance. Saarlouis, Landau, and Germersheim do not possess any strength to give them a real military value.

General Strategical Considerations.

We must now pass on to a brief review of the various courses of strategical action which were open to the Armies of France and Prussia.

Eliminating a consideration of the advantages which would accrue to France by offensive movement towards the lower Rhine, for the reason that action in this direction is barred by the neutrality of Belgium and Luxemburg, we may fairly agree with French and German writers, who are unanimous in the declaration, that quick offensive operations upon South Germany would have been the best course for France to pursue.

Prior to the war, there were not wanting German writers who declared that the extension of the German, or rather Prussian, military frontier southwards was an element of danger, and that a maritime attack would paralyze the defence of the Rhine. It certainly seems reasonable to suppose that the military co-operation of South Germany would thereby be nullified, and several German *corps d'armée* would have been completely disturbed in their efforts of mobilisation.

Invasion of Germany by the valleys of the Sarre and Moselle may also be placed aside, in company with the idea of an offensive movement towards the Lower Rhine. The operations of a large Army would be difficult, the communications being restricted. The country on the right bank of the Moselle is hilly, and the movement would bring the invading Army in front of Mayence and Coblentz. A further reason exists against this direction for invasion in the fact that there is only the railway, Metz-Saarbruck-Bingen, by which the French Army could be supplied.

We may, therefore, fairly consider that for France offensive movement above Mayence was the only course open, if invasion of Germany was determined upon.

French Plan.

The foregoing considerations doubtless formed the basis of the French strategical plan, and which is held to be as follows:*—

To concentrate 150,000 men at Metz, 100,000 at Strasburg, and 50,000 at Chalons. The first Army on the River Sarre, and the second Army on the Rhine. The enemy would be unable to determine whether this concentration was intended against the Rhenish Provinces or against Baden. The union of the Army of Metz with that of Strasburg was then to follow, and the Rhine was to be crossed at Masau, leaving Rastadt on the right and Germersheim on the left. The division of the 3rd, or Chalons Army, was to protect the rear and observe the N.E. frontier. Great political results might be expected from this course of action. The Southern German States would be obliged to observe

* "Campagne de 1870. Des Causes qui ont amené la Capitulation de Sedan." Par un Officier Attaché à l'Etat-major-Général.

neutrality, and the first French successes might obtain the alliance of Austria and Italy.

The French base of operations would, in this case, be the line of the Moselle from Metz to Nancy, and Strasburg. This base possesses several advantages. Metz and Strasburg are large fortresses and arsenals, and they were supposed to contain within themselves every means for the supply of an army. Nancy is the chief town of the department of the Meurthe, and is directly connected by rail with the capital. Metz, Nancy, and Strasburg, are connected by railway, and a good road.

Operations from this base would naturally take place on the following lines of communication, converging on Frankfort-on-the-Main.

1st. Metz to Mannheim by Sarrebruck, Kaiserlautern, Neustadt, both by rail and road.

2nd. Nancy, Saverne, and along the left bank of the Rhine, by the two great roads and railway mentioned at p. 435, leading on Mannheim.

3rd. Strasburg, across the Rhine, leaving Rastadt on the left, and moving on Stuttgardt.

Besides these main lines, there are intermediate roads from the base of operations leading across the Vosges, by which the country between the Vosges and the Rhine would be reached. The advanced German work of Saarlouis might be neglected, for it was not armed, while Landau and Germersheim possess no military strength. This plan has the advantages of turning the strong places of Mayence, Coblentz, and also Rastadt, and a secondary base might be found at Spire, Mannheim, Worms.

It appears to us, however, that the movement on Stuttgardt, and the subsequent wheeling movement which would be necessary to confront a Prussian Army on the Main, would give too much time for the concentration of that army. In pivoting on their left, the French would have to form front for battle, parallel to their line of communications with their base. Paris would also be uncovered, but this would be of secondary importance if the French could assure themselves of bringing superior numbers against the first Prussian concentration, and of obtaining a great tactical success.

If this reasoning be permitted, it would seem that the passage of the Rhine between Worms and Lauterburg at several points would have been probably more successful. The mountainous country of the Black Forest would have been avoided; the separation of Wurtemberg, Baden, and Bavaria from Prussia, would have been more complete, as so much time would not have been given for the army corps of these States to fall back towards the Prussian concentration.

Prussian Lines of Attack.

Let us now examine the lines of attack which Prussia could use if she was permitted to seize the initiative.

1st. That of Saarbruck, on Metz, or Nancy. Saarbruck is evidently an important point, being the junction of railways from Trèves, Bingen, and Mannheim, and the rear is protected by the fortresses of

Coblentz and Mayence, which thus form this portion of the German base of operations.

2nd. From Mayence, along the left bank of the Rhine, Neustadt, Weissenburg, Phalsburg, Nancy, and Saverne to Nancy, thus turning Strasburg by both lines. This portion of the base would therefore be Mayence, Mannheim, Rastadt.

3rd. Friburg, Mulhausen, Belfort, Langres, giving a line on Paris.

The first line has several advantages. The right is well protected by the neutrality of Belgium and Luxemburg, and lateral expansion for the march of columns is permitted, which can then be concentrated in the area between Thionville and Saarbruck. Trèves, the extreme right, and Saarbruck, are connected by railway.

The second line turns Strasburg and Metz, and gains a direct line to Paris, but, for a short distance, *i.e.*, between the Vosges and the Rhine, a movement along it partakes of the character of a flank march in narrow country, and the right flank might have been exposed to a French concentration.

The third line is at the south extremity of Germany, and as a subsidiary or secondary line is too much separated from the others.

We have stated that the re-entering nature of the German frontier gave Prussia a considerable strategical advantage. So long, however, as Strasburg remained in French hands this value was somewhat impaired, because it narrowed the German eastern base to Rastadt. We shall see subsequently, however, that this eastern portion of the German base was of essential value in their tactical operations east of the Vosges. The wisdom of those guiding the strategical operations of the German Army, decided to cross the Rhine in their own territory, by which means their movements were concealed to the last moment, and to advance on the strategic front Trèves, Landau, entirely on the north side of the frontier, thus securing the base of the Rhine fortresses, and directly covering Berlin.

General Situation and Concentration of French and German Armies.

It will now be necessary to describe briefly the general situation and forces of the opposing armies, and to obtain a view of the concentration on each side, for without these considerations we should be unable to enter upon the strategical position of that portion of the French Army under Marshal McMahon which was to receive the first attack of its German adversaries.

On the 12th July, 1870, the transport of French troops and *matériel* of war towards Metz commenced.

On the 15th July, war with Prussia was proclaimed, and on the 19th, the declaration of war was handed to the Prussian Government in a document which contains the *casus belli*, the plan of raising a Prussian Prince to the throne of Spain, and the refusal of Prussia to give an assurance that a "similar combination" should not be again entered into. Thus was the pretext of the candidature of the Prince of Hohenzollern, thinly veiled in official language, the subject of a declaration of war, summoning two great civilized nations to the battle-field.

We have previously remarked that in peace-time, with the exception of the Guard and the Corps at Chalons, France does not possess formed tactical units which can be placed readily on a war footing.

On paper, and according to French official documents at the commencement of 1870, the French Army consisted of—

Actual Army	400,000 men
Reserves	400,000 „
Guns	804
Cavalry	38,000 (horses)
Garde Nationale Mobile	550,000 men
Total	1,350,000 men.

In the early days of July the movement of troops took place, and the men on furlough were recalled.

Eight Army Corps and one Cavalry Reserve Corps were first formed, these constituting the Field Army.

A French Army Corps consists of about 26,000 or 27,000 infantry, 3,500 cavalry, and 90 guns, including 3 mitrailleuse batteries.

The following Army Corps were now formed:—

Guard Corps	commanded by	General Bourbaki.
1st Corps	„	„ Marshal McMahon.
2nd „	„	„ General Frossard.
3rd „	„	„ Marshal Bazaine.
4th „	„	„ General de Ladmirault.
5th „	„	„ General de Failly.
6th „	„	„ Marshal Canrobert.
7th „	„	„ General Felix Douay.

Reserve Cavalry Corps in 3 divisions.

These corps should have given a total of

241,000 Infantry.
27,500 Cavalry.
756 Guns.

The real strength of the corps first assembled on the frontier, fell far short of these numbers, and did not exceed 200,000 men.

We must ascribe this discrepancy to the absence of men on furlough, and of the reserves which were supposed to be at hand, but which, in many cases, did not even exist. In addition to these causes, some regiments were not with their corps and could not be brought up in time.

The first troops assembled were the Guards, the Chalons Corps, the Army of Paris, that of Lyons, and the African troops, numbering about 5 corps, but by the 25th July, 7 corps were in position, though by no means ready to take the field in a condition to meet the onset of their powerful foes.

The following were the positions of the corps:—

1st Corps, McMahon at Strasburg.

2nd Corps, Frossard at St. Avold.

3rd Corps, Bazaine at Metz.
4th Corps, De Ladmirault at Thionville.
5th Corps, De Failly at Bitsche.
6th Corps, Canrobert at Chalons; but one Division was at Soissons and one at Paris.
7th Corps, Felix Douay at Belfort, in state of formation.
Guard, Bourbaki at Metz.

The magazines were placed in front line, the various corps were scattered over a wide range of country, and the Army was separated by the Vosges mountains.

Ignorant of German military institutions, confident in national superiority, concentrating first and organising afterwards, obtaining no information of the designs of the enemy, or the nature of his concentration, believing it impossible for the Germans to take the initiative, such were the military attributes of the French Army and its leaders, reflected indeed from the whole nation of which an army is only the picture, whose lights and shades are strong or weak according to the power or weakness of the nation it represents.

This phase of the campaign was soon to develop into another which was to point with disastrous clearness, that confusion of organization must inevitably lead to confusion and misfortune in the field.

On the German side there was immense numerical superiority.

The war strength of the North-German Army stood at the beginning of 1870, in actual numbers, as follow:

Standing Army (peace footing)	300,000
Reserves	350,000
Landwehr	370,000
Total	1,020,000 trained soldiers.

And in addition there was:—

Ersatz Reserve	700,000
One year's contingent (called in at once)	100,000
Total	800,000 untrained men.

That is, there were 1,800,000 men available for military service, and of which 1,000,000 were trained soldiers.

In addition to this, Bavaria furnished 2 Army Corps, and Baden and Wurtemberg 1 Army Corps.

The *Field Army* therefore disposable, after mobilisation had been effected, numbered about,

466,000 Infantry.
58,000 Cavalry.
1,518 Guns.

A German Army Corps may be taken to consist of 26,000 or 27,000 Infantry, 1,200 Cavalry, and 84 to 90 guns.

The German Army was divided into three parts:—

I. Army under General Steinmetz, about 55,000.
II. „ „ Prince Frederick Charles, about 145,000.
III. „ „ The Crown Prince, about 140,000.

Army IV was subsequently formed.
The mobilisation of the Army commenced on the 16th July.
By the end of July,

The 1st Army was concentrated about Coblentz.
2nd „ „ „ Mainz.
3rd „ „ „ Mannheim.

The advanced concentration followed immediately:—

1st Army on Trèves.
2nd „ „ Homburg in Rhenish Bavaria.
3rd „ in rear of Landau and Germersheim.

The Reserve, subsequently the IVth Army, was assembled at Kaiserlautern, and consisting of the IXth and XIIth Army Corps, was to support the IInd and IIIrd Armies in the first part of their march.

With the onward march of the Ist and IInd German Armies we are not concerned. Our attention must be turned exclusively to the action of the IIIrd Army, although in considering the results of that action, we shall have to refer to the direction given to the Ist and IInd Armies. July passed away in skirmishes apparently unimportant, but valuable in the intelligence gained by the enterprising German cavalry. This intelligence and that acquired in other ways by the German headquarters' staff quickly bore fruit.

The detail of the IIIrd Army was as follows:—

V. Corps commanded by General Von Kirchbach, consisting of:—

9th Infantry Division, v. Sandrart
- 17th Infantry Brigade, Von Bothmer.
- 18th „ „ Voigts Rhetz.
- 1 Rifle Battalion.
- 1 Regiment Cavalry.

10th Infantry Division, v. Schmidt
- 19th Infantry Brigade, Schönhoff.
- 20th „ „ Walther von Mensburg.
- 1 Regiment Cavalry.

No. 5 Regiment, Field Artillery, 84 guns.
Total, 25 Battalions, 8 Squadrons, 84 guns.

XI. Army Corps commanded by General v. Bose, consisted of:—

21st Infantry Division, v. Schachtmeyer
- 41st Infantry Brigade, v. Koblinski.
- 42nd „ „ v. Thile.
- 1 Rifle Battalion.
- 1 Regiment Cavalry.

22nd Infantry Division v. Gersdorff
- 43rd Infantry Brigade, v. Kontzki.
- 44th „ „ v. Schkopp.
- 1 Cavalry Regiment.

No. 11 Regiment, Field Artillery, 84 guns.
Total 25 battalions, 8 squadrons, 84 guns.

I. Bavarian Corps, commanded by Von der Tann.

1st Division v. Stephan	1st Infantry Brigade, Dietl. 2nd „ „ Orff. 3rd Rifle Battalion. 1 Cavalry Regiment.
2nd Division v. Sappenheim	3rd Infantry Regiment, Schuhmacher. 4th „ „ Straub. 2 Rifle Battalions. 1 Cavalry Regiment, v. Mayer.

1 Artillery Regiment, and 1 Cuirassier Brigade.
Total 25 battalions, 20 squadrons, 96 guns.

II. Bavarian Corps, commanded by General von Hartmann.

3rd Division v. Walther	5th Infantry Brigade, v. Schleich. 6th „ „ v. Wissell. 2 Rifle Battalions. 1 Cavalry Regiment.
4th Division v. Bothmer	7th Infantry Regiment, v. Thiereck. 8th „ „ Maillinger. 3 Rifle Battalions. 1 Cavalry Regiment.

1 Lancer Brigade.
1 Regiment Field Artillery, 96 guns.
Total 25 battalions, 20 squadrons, 96 guns.

Combined Wurtemberg-Baden Corps, commanded by General v. Werder.

Wurtemberg Division v. Obernitz	1. Infantry Brigade, v. Reitzenstein. 2. „ „ v. Starkloff. 3. „ „ v. Hügel. 3 Rifle Battalions. Cavalry Brigade, v. Schüler. 1 Regiment Field Artillery.

or, 15 battalions, 10 squadrons, 54 guns.

Baden Division v. Beyer	1. Infantry Brigade, du Jarry Baron v. La Roche. 2. Infantry Brigade, v. Degenfeld. Combined. 3. Infantry Brigade, Keller. 1 Cavalry Regiment. Cavalry Brigade. 1 Field Artillery Regiment.

or, 13 battalions, 12 squadrons, 54 guns.

4th Cavalry Division, commanded by Prince Albrecht of Prussia.
24 squadrons, 12 guns.

Each corps had its complement of Engineers, Artillery and Infantry Ammunition Columns, Sanitary Detachments, Reserve Hospital Depôt, Horse Depôts, Field Battery, and Provision Columns.

On the night of the 3rd August, 1870, the 3rd German Army

bivouacked between Landau and Germersheim, crossed the Lauter on the morning of the 4th, and defeated the French Division, Abel Douay, at Weissenburg, after a gallant defence, by this small outlying detachment of the French Army, against overwhelming numbers.

Field Forces.

Let us now turn to examine the forces Marshal McMahon had at his disposal, and the strategical value of the position he had resolved to defend.

The Ist Corps consisted of:—

1st Infantry Division Ducrot	1. Brigade,	Wolff.
	2. „	de Postis du Houlbec.
2nd Infantry Division Abel Douay (Pellé)	1. Brigade,	Montmaire.
	2. „	Pellé.
3rd Infantry Division Raoult	1. Brigade,	L'Hériller.
	2. „	Lefebvre.
4th Infantry Division L'Artigue	1. Brigade,	Fraboulet.
	2. „	Lacretelle.
Cavalry Division Duherme	Brigade,	Septeuil.
	„	Nansouty.
	„	Michel.

Bonnemain's 2nd Division of the Cavalry Reserve.

Artillery Reserve, 48 guns.

Total of Ist Corps, 49 battalions, 44 squadrons, 96 guns, 24 mitrailleuses, engineers, train, &c.

The Ist Corps lay between Hagenau and Strasburg.

On the right, at Belfort, 80 miles distant, but connected by a double rail, was the VIIth Corps, General Felix Douay, in process of formation.

It consisted of—

3 Infantry Divisions. Each of 2 Brigades.
1 Cavalry Division.
15 Batteries.

Giving 38 battalions, 20 squadrons, 90 guns.

On the left, about Bitsche, and 25 miles from Hagenau, was posted the Vth Corps, commanded by General De Failly. It consisted of—

3 Infantry Divisions.

1 Cavalry Division (the 2nd Cavalry Brigade did not reach the corps.)

15 Batteries.

Giving 39 battalions, 16 squadrons, and 90 guns.

The command of McMahon was widely scattered.

On the 25th July, the 1st Division (Ducrot) was posted east of Wörth. The 2nd (Douay) at Hagenau. The 3rd and 4th (Raoul and de l'Artigue) in Strasburg.

The Cavalry Brigade, Septeuil, at Sulz. The Cavalry Brigade, Nansouty, at *Seltz*. The Cuirassier Brigade, Michel, in reserve.

The days were now approaching when the confidence of the Commanders of France in the power of the Army was to be sorely tried, and already signs were not wanting that their trust was shaken.

At the end of July, the French Head-quarter Staff became aware that the initiative no longer remained an easy task to them. The concentration of the German armies was noised abroad and the scattered disposition of the French corps was thrust unpleasantly before the minds of those directing the French operations.

McMahon was now directed to cover his communications with the Vth Corps at Bitsche, and on the 2nd August, the 2nd Infantry Division, under Abel Douay, was pushed forward to Weissenburg, to protect the march of McMahon's forces towards Bitsche. The 1st Division, Ducrot, was moved to Wörth. The remaining divisions were at Hagenau and Strasburg.

On the morning of the 3rd, Douay received information of the advance of the IIIrd German Army. On the 4th, he, with 8,000 men, received the attack of the heads of the columns forming this Army, and after a brave resistance was forced to retire.

That afternoon, McMahon, who was at Strasburg, received the news of Douay's defeat, and made the following dispositions:—

* The 3rd and 4th Divisions on Wörth.

The Cavalry Divisions on Wörth.

He telegraphed to the VIIth Corps (Felix Douay) to send whatever assistance was possible.

On the evening of the 4th, McMahon was at Hagenau.

The 5th was occupied in making preparations to accept battle in the position of Wörth.

The evening of the 5th he telegraphed to General De Failly that the Emperor had placed the Vth Corps at his (McMahon's) disposal, and he requested De Failly to unite with him at the earliest hour possible.

On the evening of the 4th August, the positions of the corps of the IIIrd German Army were as follow:—

Vth Army Corps at or near Weissenburg.
XIth " " "
Ist Bavarians " "
IInd " " Oberhofen and Steinselz.
Wurtemberg-Baden Corps—Lauterburg, Selz.
Cavalry Divisions { 2nd Weissenburg, in rear.
4th Weissenburg, Altenstadt.

For the 5th the following dispositions were made:—

The Vth Corps on Preuschdorf.
The XIth " Sulz.
The Ist Bavarian on Ingolsheim.
The IInd " Lembach.
The Wurtemberg-Baden Corps on Aschbach.

Marshal McMahon had now deliberately resolved to stand and bar the passages of the Vosges.

* These were on the evening of the 3rd between Reichshofen and Hagenau.

Strategical Position of Worth.

Let us examine the strategical value of Wörth in relation to the general line of the French disposition, and the advance of the German armies.

The position of Wörth covered the passes of the Vosges against an enemy advancing southwards between those mountains and the Rhine. It possessed in itself an *attractive* power, for no enemy could advance along the great roads running parallel to the Rhine, so long as the position should be held by strong force; such a movement would be essentially a flank march in presence of an enemy, and the right flank of the column of march would be, in military parlance, completely lent to the enemy.

Wörth, therefore, may be said to have covered the passes of the Vosges southward of the Lauter, and to have commanded the main *chaussées* of Alsace on the left bank of the Rhine.

Beyond this, the position may be said to cover directly the passes from an enemy crossing the Rhine from Baden. This idea may have received some development in the demonstrations German detachments made on the right bank of the Rhine.

Wörth was connected by good roads and a railroad with the right and left corps, the 7th and the 5th, and with Strasburg.

Above all, political motives probably insisted upon a stand being made for the plains of Alsace. Adherence to the sound military principle, the abandonment of territory for the purposes of concentration, was neglected, and the self-confidence of the French head-quarters prompted the Marshal to encounter what he considered the possibility but improbability of a defeat, rather than the certainty of a revolution.

When we have said the foregoing, we have exhausted the list of the strategical advantages possessed by the position of Wörth.

The first striking point is that it was only 5 miles distant from the Vosges Mountains. No second position could be found under the shelter of which a beaten Army might reform for defence. Indeed, we may go a step further, and say that for all practical purposes it was on the Vosges line itself.

The right wing of the French Army was separated from the left, the Army of Metz, by the Vosges Mountains, and an elementary principle in the defence of either a strategical or tactical line, viz., the power to concentrate on any part of it, was neglected.

In fact, the position of Wörth was disunited from the other fraction of the French Army, and the acceptance of a battle there could only be justified as belonging to an independent campaign. In this case, superiority of numbers and certainty of tactical victory might render it permissible to deliver battle in this position.

In the actual disposition of the French corps, the value of Wörth and the defence of the Vosges seems to have been completely misapprehended. And this seems the more extraordinary as the text-book of military geography, used in the Military Colleges of France, is clear enough in teaching the difficulty of defending the line of the Vosges. It needs no profound acquaintance with strategy to see how thoroughly the line of

the Vosges is turned by an advance from the strong fortresses of Mayence and Coblentz. Is it possible the French Commanders could have supposed the Germans would have neglected the advantages given to them by their natural base, and a line which directly covered Berlin?

This consideration brings us to the question of De Failly's possible action. De Failly had a corps of 30,000 men with which he was to keep up communication with the right wing and the right portion of the left wing of the French Army. He knew of the Prussian concentration at Kaiserlautern, and Homburg, but he could not anticipate that the weight of the IInd Army could be directed against Saarbruck; an advance on the Zweibrücken-Bitsche road would menace his communications with the main French Army. Consequently an advance of the Germans on the western side of the Vosges would isolate him from the main body of the French Army. These considerations probably led to the order sent to him, through McMahon, that his corps was placed at the Marshal's disposal, in the hope that tactical victory might compensate for faulty strategy.

We shall, further on, allude to De Failly's scattered disposition, and his non-support of McMahon.

Apart from the closeness of Wörth to the Vosges, it was too far from Strasburg to rely upon that stronghold as a support in case of retreat, such a line would have been endangered by the Prussian advance, while it was only allied to the other portions of the French Army by a weak and extended connection.

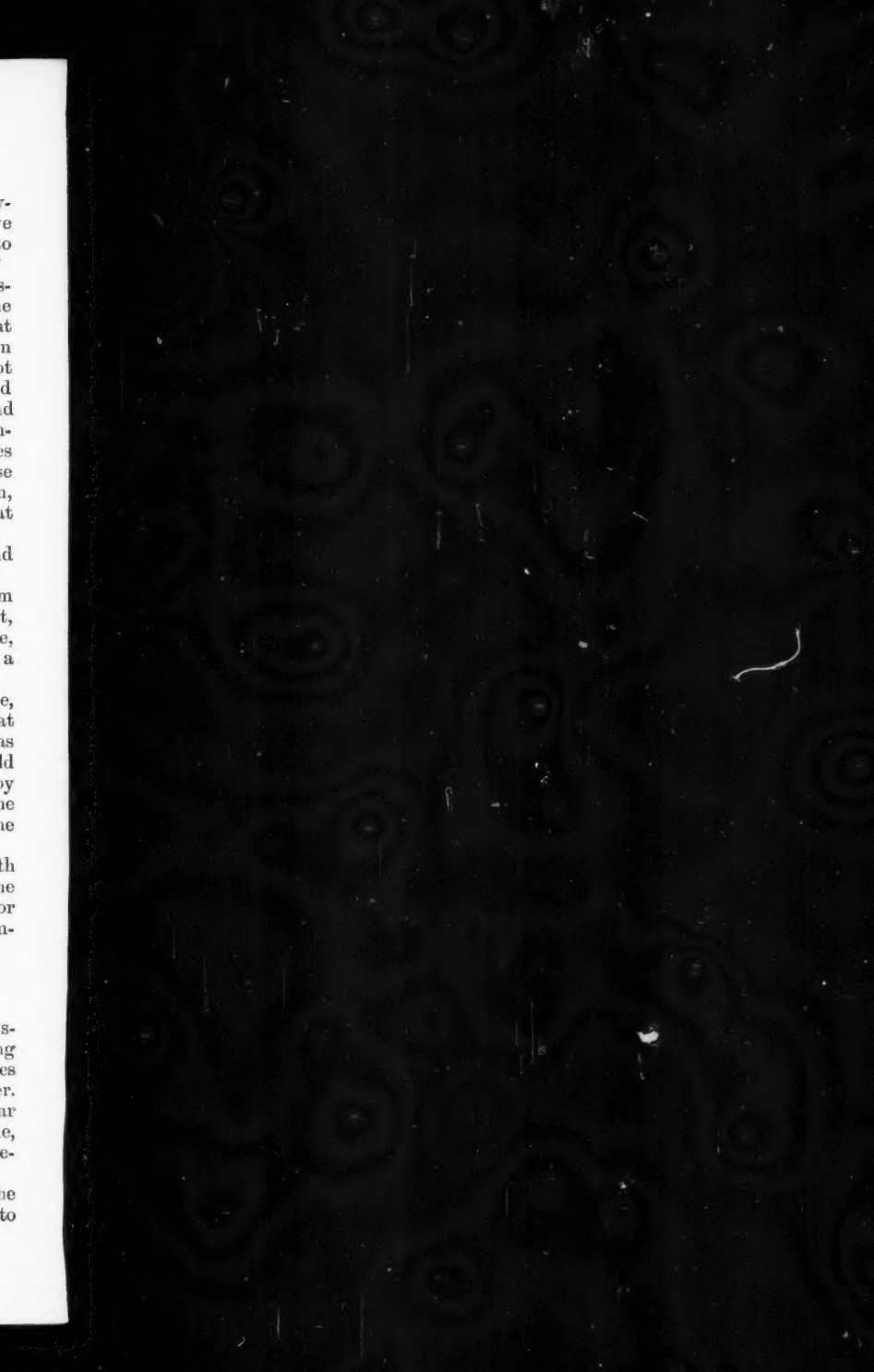
Retreat on Bitsche was, without considering the difficulty of the line, only bringing the retreating force towards fresh danger (assuming that the absolute advance of the IInd German Army on Saarbruck was unknown), so that the only course open in the case of defeat would be to retire by the passes of Lichtenberg and Petite Pierre, assisted by the railway from Hagenau, which in its circuitous course to Saverne and Phalsburg might be endangered by the active operations of the Prussian cavalry.

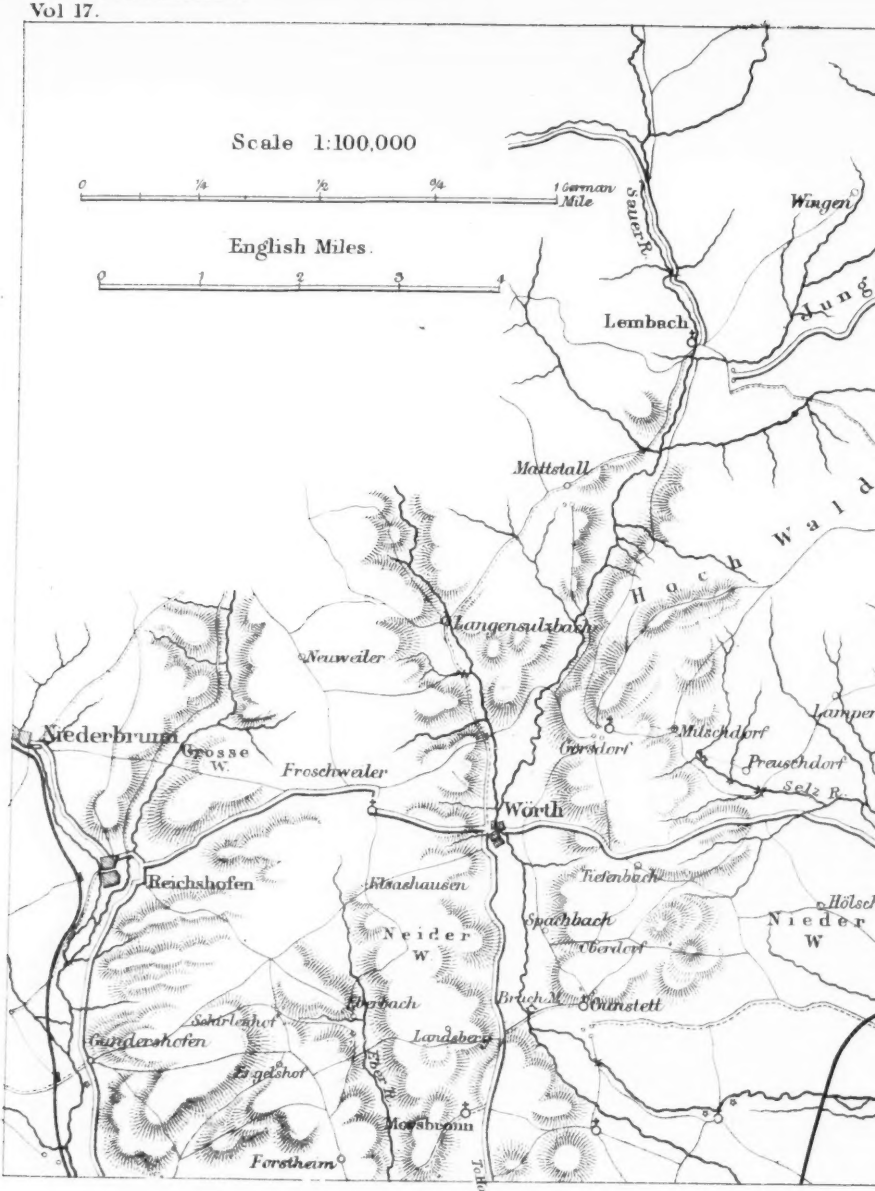
Further, the line of battle which must be formed on the Wörth position has its direction strategically advantageous for its worst line of retreat, that by Bitsche, while for retreat towards Hagenau or Saverne the line of battle must be formed parallel to the line of communication.

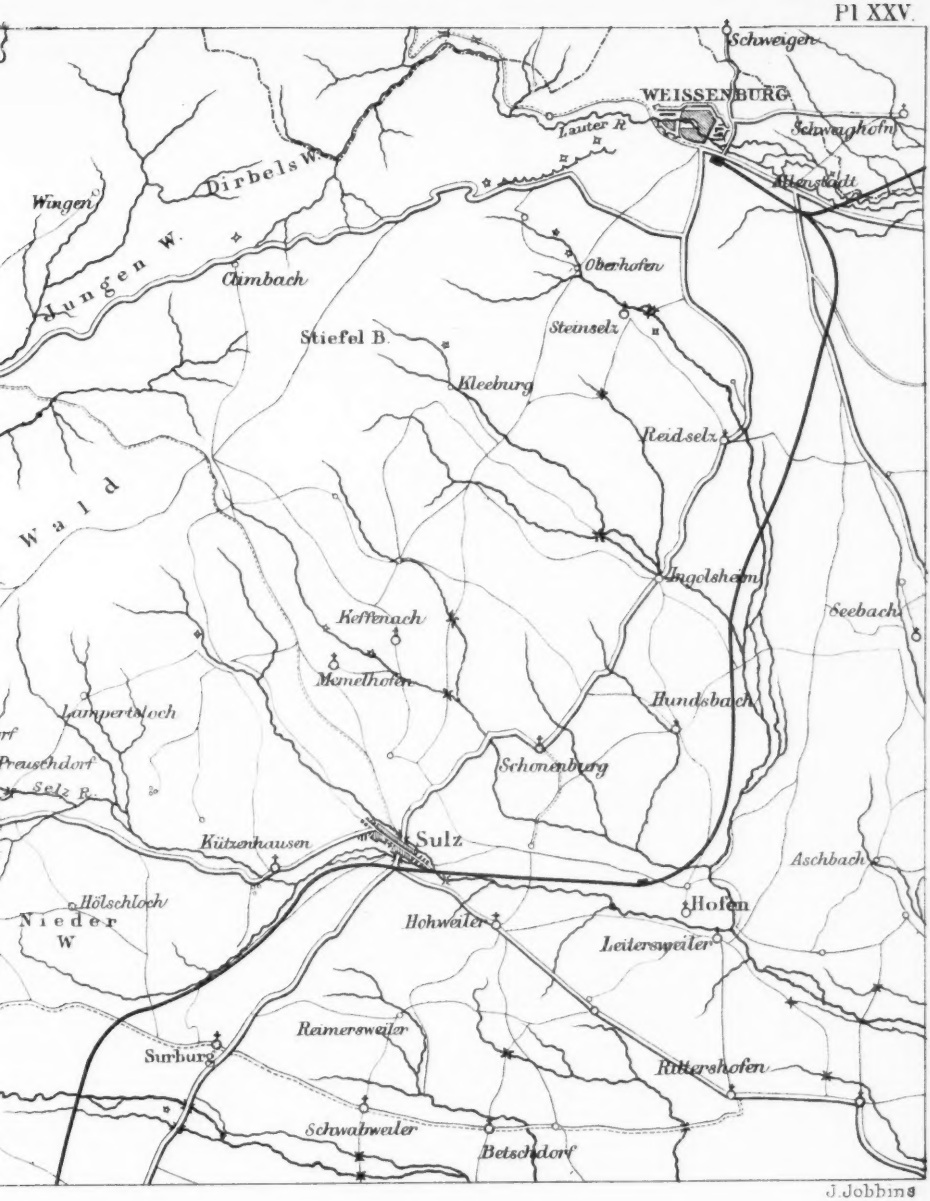
Description of Neighbourhood and Battle Field.

The Vosges Mountains, between Permasens on the W. and Weissenburg on the E., assume the character of a long promontory jutting out between two bays. In the northernmost of these bays, rises the River Lauter, and in the most southerly, the little River Sauer. The long spur or promontory running in S.E. direction turns, near Weissenburg, nearly due S., parallel to the Vosges or the Rhine, forcing the Sauer into a like parallel course until near Wörth it releases it, and allows it to find its way towards the great river.

It is this high ground parallel to the Vosges which is called the Hoch-Wald, and whose southern spurs, of gentle slope, still clinging to




Scale 1:100,000
0
¼
½
¾
1 German Mile
English Miles.
0
1
2
3
4
Sauer R.
Wingen
Lembach
Mattstall
Hoch Wald
Langensulzbach
Neuweiler
Niederbrunn
Grosse W.
Froschweiler
Wörth
Mülschdorf
Preuschdorf
Selz R.
Reichshofen
Niederwald
Spachbach
Oberdorf
Günstett
Gundershofen
Engelshof
Forstheim
Mosbronn
Landsberg
Ebbr R.
To Haguenau


Schweigen
WEISSENBURG
Lauter R.
Schweighofen
Altenstadt
Wingen
Dirbels W.
Jungen W.
Climbach
Oberhofen
Steinselz
Stiefel B.
Kleeburg
Reidselz
W a l d
Ingolsheim
Seebach
Keffenach
Mamelhofen
Lampertsloch
Hundsbach
Preuschdorf
Selz R.
Schonenburg
Kützenhausen
Sulz
Aschbach
Hölschloch
N i e d e r
W
Hohweiler
Hofen
Leidersweiler
Reimersweiler
Surburg
Rittershofen
Schwalweiler
Betschdorf

J. Jobbins

the course of the Sauer, form the position from which the Prussian IIIrd Army was to advance in attack against McMahon's forces holding the ground on the opposite bank of the stream.

The Vosges promontory or spur, of which we spoke above, declines into hilly ground until it makes the turn near Weissenburg, where it assumes a height of 800 feet, forming a high wood-covered range of hills some 6 miles long, and a prominent object in the landscape for many miles.

From this Hoch-Wald, trend out many spurs sloping very gently S.E. towards the low wooded country between them and the Rhine. Many streamlets, rising in the Hoch-Wald, flow down between these spurs towards the lower plain country, and their S.W. banks offer favourable positions for defensive actions; the left resting on the Hoch-Wald, and the right observing the low ground to which the spurs all gradually sink.

The country therefore S.E. of the Hoch-Wald, between Weissenburg and Wörth, may be described as one strongly undulated. The ground is much cultivated, here and there largely wooded, dotted by numerous villages, sometimes clustering very near to each other, a land traversed by numerous good roads, and remarkably easy for great military combinations.

The Battle Field.

The battle field of Wörth may be described as formed by two parallel lines of hills, whose altitude is about 300 feet above the River Sauer, which flows between them in a meadow valley, of a breadth varying from 300 to 1,200 yards. The eastern line of hills somewhat commands, at points, the western range.

The eastern line of hills, forming the Prussian position, is about $2\frac{1}{2}$ miles in extent, *i.e.*, from the village of Gorsdorf to Gunstett (see Plate xxv). We have called this the Prussian "position," because the extension of the line along the W. slopes of the Hoch-Wald and towards Langensulzbach can hardly be called a position in the ordinary military meaning of the term.

The opposing line of hill, upon which the French Marshal ranged his forces, was nearly twice as long as what we have termed above, the Prussian position, so that the French line, about $4\frac{1}{4}$ miles long, may be said to have outflanked that line of hill on the Prussian side over which they made their main attack, by about a quarter of its extent on either side.

The French position of Wörth was of sufficient strength to be a tactical temptation to Marshal McMahon to endeavour, in this chosen place, to stay the onward march of the columns of the IIIrd German Army.

Distant not five miles (as the crow flies) from Niederbrunn, the little town at the E. *débouché* of the pass of Bitsche, traversed along its extent by fair country roads, and transversely perpendicular to the general front by a good *chaussée*, its left flank resting on large woods and its right domineering the low country in front, and trending back to the

road which might be a line of retreat, and with open ground immediately in front, which could be swept by fire from spurs which ran forward like natural bastions; we cannot wonder that the Marshal felt unwilling to abandon such advantages without a struggle, and rather determined, confident in the valour of his troops and the strength of his position, to stake his fortunes upon one throw of the die.

The high ground or line of hills upon which the French troops were ranged, is formed by the S.E. slopes and spurs of the Vosges. It can scarcely be called a plateau, except in a very wide sense, for it is broken up into numerous small plateaus and undulations. Two of these are tolerably marked, however, by the positions of the villages of Neuweiler and Froschweiler. The right half of the position is divided very distinctly into two parallel positions by the valley through which runs the little streamlet, the Eber.

The main line of the hills forming the French position may be taken as parallel to the *chaussée* Niederbrunn, Reichshofen, Hagenau, and about $2\frac{3}{4}$ miles in front, while immediately in advance and commanded by the line of hill runs the Wörth-Hagenau road, an excellent line of communication 24 feet wide, and raised above the marshy meadow-land through which it runs.

The line of the French position is also shewn by the stream which flows from the lateral valley of Langensulzbach, joining the Sauer at Wörth, which thence flows with a breadth of about 30 feet and ordinary depth of 2 feet or 3 feet,* meandering and winding southwards until it enters the low country at the outlet of the valley where it turns in a S.E. direction to flow through the fertile plains of Alsace towards the Rhine.

Wörth itself is a small town completely commanded by the hills on both sides. Through it passes E. and W. the high road Reichshofen-Sulz, at which latter place this road joins the main Weissenburg-Hagenau *chaussée*. At right angles to this Reichshofen-Sulz road, is that of Lembach, Langensulzbach, Wörth, Hagenau, and from this at about 1,500 yards N. of Wörth, branches off another road which follows the course of the Sauer for some distance, crosses it, and attains Lembach viâ Mattstall. From Wörth also, or rather from the Reichshofen-Sulz road, and 100 yards beyond the last houses of the town, on the right passes the road to Spachbach, and on the left or N. the road to Görsdorf.

The left of the French position lay on the hills which trend back from the little village of Langensulzbach. Here a small stream runs through a valley some 400 yards wide, open, and with its N.E. slopes, in many parts very open to those posted on the French side. This line of hill on the French left was not, at its crest, so high as the front line, fairly indented, not wooded on the slope, but sprinkled with trees and copses. About halfway between Langensulzbach and Wörth a deep ravine runs back, widening out, forming small lateral ravines, and whose sides are thickly wooded.

The summit of this part of the French position is at Neuweiler, a

* It was from 5 to 6 feet deep on the 6th August, 1870.

straggling village situated on the road from Froschweiler, on the slopes and spurs of the plateau-like ground upon which was posted the French left. This ground sinks gradually down to a stream which flows towards Reichshofen through a dense forest which covers the left rear of the French position, and extends in broken and accidented ground to the foot of the mountains.

Returning to the French line, the straggling village of Froschweiler, partly situated on the level and partly on the slopes towards Wörth, commands the long ravine in front, which widens out into the low meadow-land through which the Sauer flows. The left of this ravine, looking from the French position forms a long spur, indented by smaller ravines, and covered by a wood which gradually stretches from the crest near Froschweiler down to the point where the Langensulzbach valley trends back in a N.W. direction. The slopes of this part of the position are covered with vineyard and cultivation, and their steepness varies from 5° to 15°.

The road from Froschweiler to Wörth leads over a long spur which runs out towards the town. A similar spur, broken in folds, slopes forward in the same direction, and between these lies a large ravine, with a gentle declivity of 4° or 5°, which is commanded by the ground on the line Froschweiler-Elsashausen. Upon the knoll or crest of this last spur stands the key of the French position, the village or hamlet of Elsashausen.

This Elsashausen spur breaks forward to the right front in gentle folds, down to the road Wörth-Hagenau, with slopes from 5° to 8°. A long wood, the Niederwald, in some parts thick, in others with little underwood, and trees of no great size stretches in an irregular indented line from about 400 yards S. of Elsashausen, running below the crest of the hill, and at last striking down in a four-sided patch, almost separated at one angle from the remainder, the lower side of it skirting the road Wörth-Hagenau for some 350 yards. S. of the Elsashausen spur is a ravine trending far back into the French position, and along whose W. and S. slopes stretches the wood which we have mentioned above. The ground now somewhat declines in steepness, consisting of undulating spurs of 5° or 6°, with patches of wood, and somewhat thrown back towards Eberbach. The large wood, the Niederwald, extends back to the line of the Eber stream. Still looking towards the right we see the village of Morsbronn at the foot and on the slope of the undulating hills, which near the village, at about 1,000 yards from the S. corner of the large wood, trend gently back in slopes of 3° or 4° towards the great Hagenau Wald, the little village of Hegeney lying at the foot of the E. slopes. The second line of hill, or the W. slopes of the Eber, sweep gradually back in a S.W. direction. The village of Forstheim stands on the crest of this line of hill, whose open and undulating slopes have a steepness of about 8°. Forstheim is to the right rear of Morsbronn and about one mile distant.

The Morsbronn Hills command the open country in front, and to the right front very completely. Slight undulations take but little away from the glacis-like character of the country lying below, and over

which it seems, at first sight, madness to advance any considerable body of troops under the fire of an enemy posted on the Morsbronn Hills.

The Eberbach Valley slopes gradually down from N. to S., from a point about 1 m. W. of Elsashausen and widens out gradually from near the village of Eberbach situated on the slope. The rear of the second or Eber position is formed by undulating hills, whose spurs gradually decline towards Reichshofen, and the Reichshofen-Hagenau road. The largest plateau is that of Froschweiler, in rear of the left centre of the French position and, with that of Neuweiler, form good positions, slightly interspersed by wood, but generally open, undulating and favourable for the manœuvres of all arms. Between Froschweiler and Neuweiler, there is a fall in the ground formed by a sort of saddle made by the head of the ravine, which stretches up from the valley of the Sauer, and somewhat divides the French front line.

Several roads and tracks, as shown on the map, lead up from the Sauer Valley over the line of the French position.

The villages forming part of the French position are well built, of stone and tile, and the enclosure walls round render them well adapted for defence.

Let us now examine the ground which the Germans used in the development of their attack.

On the right opposite Langensulzbach the hilly ground on the German side is in some parts open, and in others covered with wood, the slopes, however, towards the French position, are open, and indeed, we may here observe, that with the exception of a small portion of the line under the W. slopes of the Hochwald, and where there were vineyards, the slopes down which the Germans had to pass, are as open as any of our English downs, and are well commanded and swept by artillery placed on the French side. On the right, however, we find the greatest amount of wood, and this was well utilised in the German advance.

The little village of Görsdorf, situated some 150 feet below the crest of the S. spur of the Hochwald, which forms the range of hills known as the Prussian position, marks the right of the main attack opposite Wörth. The ground slopes in undulating folds gently down to the valley of the Sauer, which here widens to about 1,000 or 1,200 yards. The slopes are about 7° to 5° gradually lessening till they sink into the meadow land below. The sides of the hill are quite open, and under cultivation.

The Hochwald, which stands boldly up on the right of the German line, is well wooded, to within 300 yards of the line, where it loses its steep and rugged character, gradually blending into the softer outline of the lower hills.

The summits of the hills at this point decline gently towards the Wörth-Preuschdorf road which here crosses them, rising again slightly to the village and wood of Tiefenbach.

In the valley in front of this portion of the line is the mill near Wörth, placed at a bend of the stream.

The ground now sweeps forward in a spur, which declines with a

slope of 7° or 8° to the village of Spachbach, and trending back forms with the line of hill on the S., a long ravine, at whose *débouché* the village is situated. Again running forward, the hills close towards the French position opposite the four-sided patch of the Niederwald, which borders the Wörth-Hagenau road at this point. The W. slopes are covered with vineyards, and on the S. slope of this long undulating spur lying back in a N.E. direction, is the village of Gunstett. From this point the hills sink gradually down to the low plain country, thrown backwards in easy rounded slopes, which overlook the lower ground.

The position is traversed by good but irregularly dissected roads, such as those between Görsdorf, Tiefenbach, Oberdorf. The undulations of the line of hills eastwards and towards the high ground of Preuschdorf, well conceal the movements of troops from an enemy on the French side. A road runs from Gunstett to the Bruck Mill, over the French position. Bridges over the Sauer only existed at this point, at Spachbach and at Wörth. One thing very noticeable is the great extent of open ground (before alluded to) on the left of the German position, S.E. of Gunstett and towards Düssenbach, and again behind these villages right away to the Wald, and the high ground of Preuschdorf.

Looking from the French position, with the aid of a map, we seem at once to obtain a clear view of the Prussian line of attack. The villages stand out, clustering the houses and cottages, which in England would take away by their scattered positions from the marked character of the groups. The Hochwald towers on the left, the hills which form its spurs sink gently down towards the low-lying Alsatian plains and forests, and undulation after undulation, varied by wood and open cultivation, greet our eyes as we look in the direction of Weissenburg.

In this as in other scenes of the war of 1870–71, the country seems to unfold itself to us like a map; we can easily recognise its military features and trace the history of the feats of arms performed on it, and we cannot help the reflection coming, that strategy and tactics are alike easier than in our own intersected land.

Such, imperfectly described, is the battle field of Wörth. All that remains of the shock of war are the marks of cannon shot on the houses, the white patches where loopholes existed, new houses in place of those burnt down, and above all, the white crosses which remind us in looking over the quiet beauty of the landscape, that here Frenchmen and Germans fought and died the death of heroes, for the honour of France, or the glory of the Fatherland.

Disposition of Troops.

On the 5th August, McMahon disposed his troops as follows:—

The 1st Division (Ducrot), right on Froschweiler, left on the Grosse Wald,* in rear of Neuweiler.

* The French official despatch says "in the direction of Reichshofen, resting on a wood covering this village." If this was the case, the left wing of the Marshal

The 3rd Division (Raoult), forming the centre, on the line Froschweiler-Elsashausen.

The 4th Division (L'Artigue), along the line of hills towards Morsbronn.

The 1st Infantry Division of the VIIth Corps (Conseil-Dumesnil), arrived the evening of the 5th from Hagenau, where it had disembarked from the railway. Its artillery was on the railway, Colmar-Hagenau. The division was posted in rear of the 4th Division.

The 2nd Division (Abel Douay's, now Pellé's), arrived by rail in the evening from Hagenau. It was posted in reserve in rear of the 4th Division.

The Reserve Cavalry Division, Bonnemain, was posted in rear of the centre, on the undulating ground halfway between Elsashausen and Reichshofen.

The Cavalry Brigade, Septeuil, was posted in rear of the centre and towards Reichshofen.

The Cavalry Brigade, Michel, was ranged on the same line as the Cavalry Division Bonnemain, but still further to the right, on the ground sloping towards the Eber, and in rear of the 4th Division. The Cavalry Brigade Nansouty was detached. To enable the offensive to be taken easily, the bridges over the little River Sauer were not broken.* Engineer officers were sent to explore the lines of retreat, and detailed instructions were issued for the retreat.

Later in the evening a telegram was sent to De Failly, directing him to unite with the 1st Corps as soon as possible.

We have no absolute evidence to show what were the exact lines of retreat the Marshal determined upon, nor do we know whether he was kept informed by telegraph by De Failly, or the head-quarters, as to the advance of the Second German Army W. of the Vosges. Further, the question as to whether he had been placed in possession of the change which had taken place in the plans of the head-quarters from offensive to defensive. He would probably know that Frossard was at Saarbruck with the IInd Corps, and that the Prussians had concentrated at Kaiserlautern and Homburg, so that an interval, if De Failly was drawn towards him, must exist between Frossard and Bitsche, through which it might be possible for a German column to advance. In any case Bitsche leading too near to the enemy's advance would not seem a favourable line of retreat. But how are we to reconcile this, supported as it is by the disposition of the Marshal's left wing, with the fact that a French detachment of two companies was directed to hold Jägerthal, a village three miles from Froschweiler, at the mouth of a defile leading eventually to Bitsche? Again, the officer who took a despatch from the Marshal on the 6th August to De Failly, chose, not the pass of Niederbronn, but a secondary valley leading from Reichshofen towards Bitsche, because it was feared the Prussian

would nearly face one line of retreat, that by Bitsche. From information obtained subsequently, it appears that the *first* disposition of the French left was made with the idea of an attack from a northerly direction.

* Orders were at first issued for their destruction.

cavalry were in the Niederbronn Valley. As a matter of fact the Marshal did use both his Jägerthal-Bitsche and the Niederbronn-Bitsche lines of retreat.

Besides the circuitous lines by Hagenau, there were several good country roads open as lines of retreat.

1.* Niederbronn-Oberbronn-Rothbach-Ingweiler, by the pass of La Petite Pierre to Saar-Union, where roads from Sarreguemines, Tuttelange, Bitsche, Phalzburg, and Hagenau unite.

2. By Gundershofen-Rothbach, the pass of Lichtenberg-Wimmenau, and eventually to Saar-Union or an intermediate line, Gundershofen-Bärenthal-Mullerhausen-Lemberg.

3. The Saverne road by the pass of Phalsburg.

Between Ingweiler-Wimmenau there was a country road, Ingweiler-Spachbach-Eckarstweiler.

There are also numerous tracks suitable for the passage of infantry and cavalry.

On the evening of the 5th August the IIIrd German Army stood as follows:

Vth Army Corps at Preuschdorf.
XIth „ „ „ Sulz, and in advance.
Ist Bavarian „ „ Ingolsheim.
IInd „ „ „ Lembach.
Wurtemberg-Baden at Aschbach.
Cavalry Division at Schönenburg.

The general line being on the little river Selz;
Head-quarters at Sulz.

The dispositions for the following day, the 6th, were:—

Vth Corps on the line of the Sauer.
XIth „ on Holschloch.
Ist Bavarians on Preuschdorf.
IInd „ to line of Sauer on extreme right.
Wurtemberg-Baden from Aschbach to Hohweiler and Reimersweiler.

Cavalry division and head-quarters to remain at Schönenburg and Sultz respectively. That evening, the 5th, the outposts were established on the line of hills E. of the Sauer.

Let us now return to view the disposition made by Marshal McMahon for the defence of the position of Wörth, and the relation of the numbers of men to the extent of ground.

On the left the 1st Division (Ducrot), 13 battalions occupied a line 2,400 yards in extent. Allowing 650 men† per battalion, this would give 8,450 infantry for 2,400 yards, and they were probably, therefore, in two lines. This division gave two companies to Neuweiler.

The 3rd Division (Raoult), about the same strength, occupied the long spur opposite Görsdorf, its right resting towards Elsashausen.

* This is a high road.

† It is difficult to find the exact strength of the French battalions. The above is only an average.

The length of this line was about 2,000 yards, and the line was broken by the ravine on the N. of the Froschweiler-Wörth road.

This division furnished the garrison of Wörth.

The 4th Division (L'Artigue) occupied the remainder of the line as far as the hills behind Morsbronn. This village was not occupied defensively at first. The 4th division, therefore, about 8,450 strong, occupied a line nearly 4,000 yards in extent, including in its line a great wood, which by its nearness to the Prussian line of hills formed a weak point. Elsashausen was garrisoned by the 4th Division. This line, however, was supported by Conseil-Dumesnil's division, the 1st of the VIIth corps.

The woods on the left were probably occupied in some way by the 1st Division, but the general line ran from some 700 or 800 yards S.W. of Neuweiler, in a S.E. direction to the spur N. of the Froschweiler-Wörth road, and then due S. towards Morsbronn.

The total length of the line at first occupied would be about 8,400 yards, and in this line were placed about 33,800 infantry (including Conseil-Dumesnil's division, Pellé's division being in reserve), 102 guns, 30 mitrailleuses, and 5,400 cavalry.

The total number of troops at the disposal of Marshal McMahon would be about:—

40,000 infantry.*
5,400 cavalry.
132 guns and mitrailleuses.

The Artillery were mostly posted on the Landsberg (Albrechtshauschof) and at Elsashausen, in the front line.

The Tactical course of the Action.

First Phase.

The dispositions ordered by the Crown Prince for the 6th August, commenced at dawn on that day. At daybreak skirmishing began along the line of the Sauer, between the outposts of the opposing armies, but on neither side was action expected.

The advanced guard of the 4th Division of the IInd Bavarian Corps (Bothmer) engaged the outposts and advanced troops of the 1st French Division (Ducrot), posted near Langensulzbach. This was about 7 A.M.

On the centre, Major-General Walther v. Montbary, commanding the 28th Brigade, 18th Infantry Division, the advanced portion of the Vth Corps, sent a battalion down the slopes of the hill to attack Wörth, covered by the fire of the batteries of the advanced guard. It was repulsed with heavy loss.

On the left the advanced guard of the XIth Corps had reached Holschloch.

* This is probably somewhat under the mark, but it is allowing 650 men per battalion. The French war strength is about 940 strong. The losses of the 2nd Division (Abel Douay) at Weissenburg have been deducted.

The attack, therefore, was in a sort of wide echelon of corps from the right which was hotly engaged, the guns of the IInd Bavarian Corps having reached the hills E. of the Langensulzbach Valley, and replying to the fire of some of Ducrot's guns, advanced forward.

Gunstett was occupied by a detachment of the Vth Corps.

The Commander of the Vth Corps, mindful of the orders of the day, directed the attack to be broken off. This order, however, could not be carried out, for by 8 o'clock the first detachment of the XIth Corps, which was marching towards the direction of the firing, the 87th Regiment, debouched from the woods in rear of Gunstett, and reinforced that village, and the left of the line was engaged.

Second Phase.

At 9 A.M., therefore, the situation was as follows:—The fringe of the various German Corps was just becoming entangled with the French line, for the IInd Bavarians, in greatly superior force, were gaining ground on the right. In the centre, the advanced guard of the Vth Corps was engaged, and on the left the advanced guard of the XIth Corps were deploying, four batteries took position, and unlimbered on the long hill N.W. of Gunstett.

The remainder of the XIth Corps and the Wurtemberg-Baden Division were still from three to five miles in rear of the left.

The Ist Bavarians was marching towards the centre of the line, or upon Preuschdorf.

On the right wing, the IInd Bavarians gradually gained ground, mastering the terrain by degrees, and pushing back parts of the 1st Division of the French, up to 10·30 A.M., when the order was received from head-quarters to suspend the fighting, and in consequence of this, General Bothmer withdrew his troops from the Langensulzbach position.

On the centre, the Vth Corps deployed in two lines by divisions; the 10th Division in first line, the 9th Division in second line, and the batteries of the advanced guard were reinforced by those of the main body or corps artillery, the whole being posted on the high ground S. of Görsdorf, and opposite Froschweiler. The effect of the superior fire of 84 guns soon becoming visible, the order was given to assault Wörth, and endeavour to gain the spurs beyond. While the centre was thus developing in strength, the left was gradually acquiring importance in the line of battle. In consequence of the marching of French troops in the direction of Gunstett, the advanced guard of the XIth Corps had been quickly deployed, and the artillery massed on the hills N.W. of Gunstett. The main body of the corps was advancing to reinforce the line. The Brüchmuhle was occupied, and the 22nd Division of the XIth Prussian Corps was advancing S. of Gunstett, in the direction of the Landsberg.

Let us now turn to the French dispositions.

On the left a change had taken place. The 1st Division (Ducrot) had changed position to its right, and was now more in a line prolonged from Elsashausen-Froschweiler towards Neuweiler.

The centre (Raoult) was occupied in replying to the artillery of the Vth Prussian Corps, and in repulsing the efforts made to take Wörth, and after that point was captured at 12.30 P.M., in endeavouring to prevent the Prussians from establishing themselves on the spurs of the hills on the French side of the Sauer.

Several batteries were posted at Elsashausen, and firing upon the advancing left wing of the Prussians, as well as endeavouring to reply to the artillery of the Vth Prussian Corps, part of which was established on the hills S. of Tiefenbach.

On the French right, L'Artigue had concentrated his divisional artillery on the Landsberg against those of the XIth Prussian Corps. At 10.30 A.M. the right wing of the French made a strong offensive movement against the Prussian left, a brigade (Lacretelle) of the 4th Division was advanced by Morsbronn against Gunstett, but was repulsed and followed across the open as far as the Wörth-Hagenau road, which, raised above the meadow land, gave them cover. At 11.30 a second attack was made upon Gunstett by Conseil-Dumesnil's division, which established itself in the outskirts of the village, but were shortly after driven back by the 21st Infantry Division (Schachtmeyer) of the XIth Corps.

Up to 12.45 A.M. the battle had languished on the extreme right of the Germans, but at this hour the order reached the IInd Bavarians that the fight was to be continued, and gradually the advanced portion of the Ist Bavarians approached the battle-line Langensulzbach-Görsdorf, passing by the latter village.

In the centre, Wörth had been taken by the 10th Division of the Vth Corps, the endeavours made by the French to retake it were repulsed, and efforts were made to gain a footing on the slopes of the hills beyond.

On the left, at 12.45, the corps artillery had arrived and deployed. The 22nd Division, advancing against the French right, pushed it back from the Morsbronn Hills; the Wurtemberg cavalry brigade also menacing the enemy's extreme right. The 21st Division, XIth Corps, was now under cover of a heavy artillery fire, advanced across the Sauer, and gained the Elsashausen Niederwald, opposite Spachbach. At about 1 P.M. therefore, the French line was being gradually thrust back and compressed on its flanks, on the left, a raging conflict was maintained in the woods, on the centre, the German line was now creeping up towards Froschweiler and Elsashausen, despite the desperate efforts made to dislodge them, while on the right, the 4th Division L'Artigue was thrown back on the Eberbach by the increasing pressure of the XIth German Corps.

Third Phase.

The decisive advance of the whole German line commenced about two o'clock.

On the right, the Ist Bavarian filled the gap between the extreme right, the IInd Bavarian, and the centre, the Vth Corps. Advancing across the meadow land, they threw themselves into the woods which stretch from the long spur N. of Froschweiler, down to the lateral Langensulzbach Valley, and won their way step by step up the vine-

yards and slopes of the French position. On the extreme right, the IInd Bavarians were gaining ground, but strongly and heavily checked every now and then by the brave efforts of the 1st Division, which was now opposed to two whole corps.

On the centre, the Vth Corps had succeeded in establishing itself on the E. slopes of the French position, advancing by a "continuous forward rallying" of small fractions. Detachments had joined with the 21st Division of the XIth Corps, and were mastering the Elsashausen Niederwald by degrees. On the left, the 21st Division was working up through the wood in the direction of Elsashausen. The Wurtemberg-Baden Corps was now arriving to the support of the XIth Corps. One brigade had arrived at Gunstett about one o'clock, and was directed on the Landsberg-Eberbach line. The divisional cavalry filled the gap between the Wurtemberg Corps and the XIth Corps. The guns of the German left wing had established themselves on the hills E. of Eberbach, and the Wurtemberg cavalry brigade was moving up behind the extreme left. The cavalry division had advanced upon the ground between Gorsdorf and Tiefenbach. At two o'clock Elsashausen was taken.

Fourth Phase.

The French, therefore, were now being turned on both flanks. On their *left*, the 1st Division (Ducrot) was endeavouring, from the plateau of Neuweiler, to make head against the pressure exerted by the Ist and IInd Bavarians. In the *centre*, Froschweiler still remained to them, but its safety was now endangered by the capture of Elsashausen by the Germans. Accordingly, it was now that Marshal McMahon directed all his efforts against the enemy's centre. Down the gentle slope, charged Michel's Cuirassiers against the XIth Corps, and the Wurtemberg soldiers. But the terrible sacrifice was fruitless. The Cuirassiers were annihilated. The infantry now tried to regain Elsashausen, but in vain. Part of the French right wing (of L'Artigue and Conseil-Dumesnil's division) had been somewhat separated from the centre by the attacks of the XIth Corps, and the possession of Elsashausen would have re-established the line of battle.

Froschweiler now became the centre of battle, and every effort was made by the French Marshal to keep it. The reserves were brought up and directed against Elsashausen, the cavalry charged the Prussian infantry with unequalled and desperate gallantry. But the day was lost to the Marshal.

The Prussian and Wurtemberg Corps were closing round. At 3.30 P.M. Froschweiler was taken, and the battle won by the Germans.

The French infantry retreated through the woods and over the hills, some towards Reichshofen, some through the forest to Niederbronn, others by Jägerthal; the artillery by the roads. Little help was obtained from General de Failly. Part of the division, Guyot de Despart, arrived at Reichshofen by rail,* and somewhat protected the

* The local people say *none* of De Failly's troops passed Niederbronn, and that when the French retreat began, they simply faced about. Perhaps there were *other* portions of De Failly's troops.

retreat by Niederbronn. At the entrance to the pass the advance of the German cavalry was checked. The main portion, however, of the French troops retreated towards Saverne.

The French lost 4,000 men and 8,000 prisoners. The Germans lost 8,000 men, including 400 Officers.

Comments.

The position of Wörth is tactically very strong, but its strength depends upon the occupation of the whole line, from Langensulzbach to Morsbronn and back to Forstheim. Elsashausen, from its commanding situation near the centre of the line, is called the key of the position, and it is so, no doubt, but at the same time we should be inclined to attach equal importance to the wood near, because from that wood the rear of the centre can be penetrated and Elsashausen and Froschweiler can be turned. This wood, called the Elsashausen Niederwald, is evidently the weak point, as at its lowest end it trends out towards the German side, and afforded them the quickest point of passage across the meadow-valley, which was swept by fire. This was therefore the point at which the Commander of the XIth Corps aimed the brigade which he sent across the Sauer. We are told that the position was entrenched, but beyond shelter-trenches we are not told what works were constructed. Few positions offered more favourable opportunities. A field-work on the Neuweiler plateau, intermediate between that village and Froschweiler, and connected by shelter-trenches, would form an excellent second line for the left, shelter-trenches round the crest of the line of hill as a front line, and the right continued beyond Morsbronn, by a fieldwork on the spur to the S.W. of that village.

The right was very strong, because it commanded the low country, which formed a kind of glacis in front of it. Entrenchments here would have assisted to prevent the turning movement made by the Germans.

The left was a point favourable for attack on account of its wooded character. Marshal McMahon expected attack on this flank, it is said. If this be the case, it is difficult to understand why the wood and heights bordering the Langensulzbach Valley were not occupied in force at the commencement of the action. When however he saw the advance of the IInd Bavarians from the direction of Marstall towards Langensulzbach, he considered that it was only a demonstration (so it is reported), and that they could not have marched so widely in any strength. A glance at the map, however, shows that there is an excellent road from Weissenburg to Lembach, which affords good scope for the favourite manœuvring of the German Commanders. The position would have been greatly strengthened by the felling of the lower part of the Elsashausen Niederwald, where it abuts upon the Wörth-Hagenau road, and by the formation of a log-parapet and abatis, such as were used in the American war.

Having said this with regard to the actual position, let us examine the formation the Marshal adopted. It appears *too deep* for the ground, and that so far from the line taken up being too long, it was

not long enough. We are told that "masses of troops" appeared every now and then on the hills, and the column-formation seems to have been adopted up to a line which brought them within the enemy's zone of fire.

In the conduct of the early part of the battle, we are at a loss to perceive the advantage of the successive French attacks upon Gunstett. That village is on the S. slope of the hills, and the possession of it could have no influence on the advance of the Germans on the line of hills to the N. Had the French right been extended and maintained, the possession of Gunstett would have narrowed the German frontal advance, and probably the attack by the German right would have been more developed. But in the actual circumstances of the combat, Gunstett would have become an isolated post, and its garrison would have fallen an easy prey to the Germans when their attack on the French right had strengthened itself. Further, in attacking Gunstett across the valley, the advantages of the defensive were abandoned without any prospect of adequate result. The position of Wörth is essentially a *defensive* one, the hills on the E. side are so much of an equality in height and steepness to those on the W. side (the French position), that the value of offensive returns from the defensive line is impaired, for in the first movement down the slopes of the French position we are uncovered to the enemy's artillery and musketry, and in endeavouring to mount the opposite slopes we are precisely at the same disadvantage the enemy experienced in his attack upon our defensive position. Nor could the possession of Gunstett by a few battalions prevent the wide turning movement the Germans made upon the French right. The proper defence of that right was the arc sweeping southwards from Morsbronn to Forstheim.

The "change of position to the right" of the French left wing was, it is stated, executed with marvellous precision. But it came too late; the IInd Bavarians had already gained a footing on the wooded slopes S. of Langensulzbach, and the faultless execution of the manœuvre was of little avail against the ever-sweeping-on fractions of the Bavarian corps.

Condemning, then, the offensive attacks upon Gunstett, we turn to the consideration of the last offensive attacks of the French Marshal, made with the object of regaining Wörth and Elsashausen. With regard to the former, it admits of argument whether the possession of it in the last phases of the action was of sufficient value to induce such a sacrifice of life. As a retarding point, it was, in the first instance, no doubt valuable, but with the increasing pressure on both flanks, it appears not to be quite certain that the efforts to retake it would be followed by any important military result. On the other hand, the attacks on Elsashausen from Froschweiler, and the effort to break the German centre were strictly justifiable, as a general principle. The employment of the cavalry, however, was a melancholy proof of its valuelessness against unshaken infantry armed with the breech-loader.

McMahon is said to have divided his artillery too much. We may perhaps be permitted the remark that in the early phases of the action this was almost a necessity, and the ground of the French position

certainly admits of the "dispersion of guns and the concentration of fire." The first part of this precept was carried out, but not the latter, with sufficient precision. In the latter phases of the action, probably the guns might have been massed with greater advantage, both to keep down the fire of the artillery of the Vth Corps, and to hinder the advance of that corps, and the right wing of the XIth Corps.

The reserves were not used sufficiently early in the action.

We may then consider that if the position of Wörth was to be held, the line should have been more extended than it was, and a greater development of fire should have been obtained. But the task imposed upon the French soldiers was too great. Apart from the fact that their genius lies not so much in defensive as in offensive warfare, the position on its left and right centre, admitted of too many possible danger-points, the forces were too unequal to make head against the continually reinforced line of the Germans, whose numbers rendered ultimate victory almost a certainty.

All that criticism can say is, that a better disposition of his troops might have rendered that victory less advantageous to the Germans, and less fatal to the cause of France.

Overweighted by superior force, *over-matched in artillery*, the French troops fought with a desperate gallantry, which it seems almost superfluous to praise. Conceding to the German troops the meed of admiration which their valour and discipline must command, those who have viewed the scenes of this campaign cannot fail to bear witness that it was equalled by the soldiers of France, who, fighting in an attitude not fitted to their national characteristics, were yet led by their chiefs to the attack over ground deluged by the fire of their enemies.

It is not our purpose to enter into the discussion of that part of the subject which concerns General de Failly. In the first place, the fault lay with the plan of the French Staff, which allowed the fractions of the Army to be so widely separated, and in that organisation which did not secure the inter-dependence of the various Army corps, nor keep each Commander accurately informed as to the positions taken up by the divisions of the others.

In the second place, General de Failly was not sufficiently concentrated. He mistook the *dispersion* of his troops for observation, which latter operation could have been performed by cavalry and by outlying small detachments. This fault may also be traced to his instructions which bade him keep up communication both with Frossard and McMahon.

Lastly, viewing the actual position of his divisions, we may say, that had he taken action at once on the evening of the 5th, when he received McMahon's telegram, he might have reached the field of battle with a considerable portion of his corps.

The infantry might have crossed by the tracks which run by the road, and over the mountains, and also marched by the railroad, the artillery and cavalry by the excellent road from Bitsche to Niederbronn.*

* Not a mere "mountain-road," as stated by the author of "Gedanker und Betrachtungen."

Prompt action on the part of De Failly, absolute subordination to the order he received, would probably have greatly lessened, though it might not have completely averted the disaster which befal the French arms.

The German Tactics.

In considering the tactics employed by the Germans at this battle, we must remember that much is hidden, unless we know the history of the conduct (*i.e.*, the tactical leading) of each battalion. The general result is success; but tactics become comparatively easy when we possess a preponderance of artillery, and such a superiority of force as to enable us to turn an enemy on *both* flanks. Again, the configuration of the German frontier ga ' the Crown Prince tactical and strategical advantages in addition to those secured by superiority of numbers. Direct retreat upon the Rhine, over which pontoon bridges could be thrown in twenty minutes, would have brought him upon part of the German base, so that beyond the fact of his superior forces, the attacks made on the outer strategical flank of the French, both at Weissenburg and Wörth, lost nothing to the general strategical situation.

We have before alluded to the question of the tactical flank by which it was most desirable to attack. The French right flank offered certain advantages. It was not strongly occupied (but this could not have been known at first); an attack upon it endangered the Marshal's principal line of retreat (presuming the Crown Prince knew of the advance of the IInd Army, or could calculate upon its position, 5th and 6th August); and even supposing Bitsche remained a good line of retreat for the French, a strong development of pressure upon their right would force the French Army into the narrow limit of the Niederbronn Pass. The French right, however, was tactically a strong position, it completely commanded the low ground; and it does not seem too much to say, that the plain country below it would be almost impassable were the Morsbronn line of hill and S. held by artillery and infantry. The only way would be to turn the line by a long detour, and so gain the second parallel position on the W. hills of the Eberbach Valley.

On the other hand, the French left offers many advantages to troops so skilled in wood fighting as were the Germans, and the advance is well concealed. Altogether, if it had only been possible to attack by *one* flank, the left flank is that which offers the most advantages with the least sacrifice of life.

The action of Wörth, as is well known, was not fought upon any forethought-out plan. It was begun by the enthusiasm and eagerness of the troops, and the desire of the Commander of the advanced guard of the Vth Corps to entangle the French in fight, and to prevent a suspected retreat. It continued in the gradual deployment of the advanced troops, under cover of their artillery, well to the front. It developed in the gradual mastery of ground and positions, under the protection of a powerful artillery. It culminated in the capture of the keys of

the French position by direct attack, while the flanking corps swept round and encircled the French wing.

The presence of the Crown Prince earlier on the field might have obviated the mistakes which led to the attack on the French left being suspended for some time. This was the critical moment, for it was then just within McMahon's power to concentrate from left to centre, and break the force of the German attack, which at that time was slight.

In the first weak attack upon Wörth, and in subsequent endeavours to pass over ground swept by the French fire, German Commanders showed a disposition to hold life cheap, when the sacrifice (looking at their superior force) was not completely necessary.

That the extraordinary efforts of the German troops were successful, is due to their admirable courage and discipline, and to their military education, physical and mental. With a greatly superior artillery, and the power of flank attacks, it appears to be a question whether any Commanders are justified in sending large bodies of troops across such open ground as the valley of the Sauer.*

The handiness of the Prussian company column shewed itself at Wörth; the men rushed across the open, sometimes forming up where cover presented itself, sometimes continuing in extended order, but they had not then gained the bloody experience of the absolute necessity to adapt all formations both to ground and the opposing fire—an experience which all their military education did not give them, until 6,000 of the Prussian Guards had been sacrificed on the slopes of St. Privat.

Of the excellent service of the Prussian cavalry, of the Prussian Staff, the independence, and yet union, of the Corps Commanders, time only permits us to mention with admiration.

The power of the artillery; the early development of its fire; the preparation made thereby; the concentration in large masses because the ground on their side required it, and because it was necessary to do so, in order to concentrate fire upon certain points of the French line, are all points especially deserving of note.

The Influence exercised by the Battle of Wörth upon subsequent Operations.

It is not difficult to trace the disastrous influence the defeat at Wörth exercised on the succeeding operations of the French Army. The right wing (McMahon) of that army could make no fresh stand against the victorious IIIrd German Army. The passages of the Vosges lay open to the enemy, the Vth French Corps (De Failly) was isolated, and the retreat of that corps and of the Ist Corps, gave the IIIrd German Army the line of operation towards the right of the great line of defence formed by the Moselle. Had the right of that line, viz., Frossard, been maintained by the right wing of the French Army, the Ist and IInd German Armies could not have crossed the Moselle, and fought the battle of the 16th August, Vionville, on a line absolutely parallel to their line of communications, or that of Gravelotte on the 18th, ab-

* The 21st Division, XIth Corps, lost 4,000 men in their efforts to cross.

solutely on a line perpendicular to the line of communication with, and facing their own base. The delay necessary to force the Moselle, would probably have given Bazaine time to retreat upon Chalons, upon which place also the right wing of the French Army would have converged.

In the actual state of the case, the French right wing was, part of it, on the 15th at Chalons; the German line was on the Moselle prolonged and secured by the IIIrd German Army at Nancy.

The garrison at Strasburg was paralysed, and although at first sight the Germans fought at Gravelotte in the manner described, they really fulfilled every condition of security because the line of railway, Ars-Frouard-Nancy-Luneville-Saverne, was in their hands, and they were fighting perpendicular to that line, which was an available line for supply and communication. It seems, therefore, unfortunate that McMahon and De Failly should not have endeavoured to halt on the Moselle line, instead of retreating by Luneville, Neufchâteau, and Charmont. With the aid of the railway they might have at least gained Pont-à-Mousson, or have joined hands with the Army of Metz at that place.

The able author of "Gedanken und Betrachtungen über den deutsch-französischen Krieg der Jahre 1870–71," considers that McMahon should have concentrated at Brumath, and that Hagenau on the line of the Möder offers a good defensive position; that forced from this, McMahon could have taken up a position at Brumath on the line of the Jura; that this would have given time for De Failly, and the VIIth Corps (Douay) to join him, and that his eventual line of retreat could have been by Belfort—Besançon—Lyons. He further remarks that the ground traversed by the stream flowing from the Vosges offers good defensive positions. In the first place, reasoning by analogy, can we believe that McMahon driven from Hagenau, could have reformed at Brumath? And supposing he had been able to do so, how would De Failly have joined him? The IIIrd German Army would in its onward march to Hagenau and Brumath, have taken good care to destroy the railway connection between Bitsche and Hagenau, by employing their cavalry for that purpose, and De Failly would have only reached Brumath by a long detour by road W. of the Vosges Mountains. The superiority of the IIIrd German Army to any force McMahon could collect, would have overpowered him at Brumath, he would have been off the direct line of retreat to Paris the moment he quitted Brumath to retire towards Belfort, and so far from chaining the IIIrd German Army, it would have been able, just as it actually did, to secure the right of the French Moselle line of defence, and thus operating on one strategic front with the IInd and IIIrd Armies, have assisted those armies in their operations against the Army of Metz. Had the Army of McMahon been of sufficient strength, a position like Saar-Union would have offered more advantages, as it would have been central to attack the enemy's columns debouching from the Bitsche and Phalsburg passes and those intermediate. De Failly might have fallen back by Saargemünd and the general line of the French Army would have been from Saar-Union—Saaralben—St. Avold. But the first real line

of defence was doubtless the Moselle. The position of Wörth was false strategically, and its tactical value was illusory. Both De Failly and McMahon were practically isolated from the French left, and the dispositions of these corps, and their action, shew fully that the French Head-Quarter Staff did not possess the power, nor the army the organisation, to change an offensive plan into one requiring a defensive attitude, by a transition sufficiently rapid and skilful to concentrate their scattered forces against the tide of the German advance.

The Tactical Lessons of the Battle.

In considering the tactical course of the battle of Wörth, the question naturally occurs, as to what formation a British Army would have adopted in the attack of a similar position? and in what manner would it have been formed for the defence of a position such as the French held? Unless these questions are answered in some way, unless we attempt to draw instruction from the terrible experience of such wars as 1866 and 1870–71, and to learn the lessons set so plainly before us, little benefit can accrue from a study of these campaigns. In answering the question as to what formation a British General would have adopted in attacking the position of Wörth, we can only consider what are the regulations at present in force.* According to these the advance of the main body would have been preceded by skirmishers. Probably in some parts of the field these would have had "supports" and "reserves" while in other parts of the ground, these last could not have been needed.† The relative distance of these supports and reserves might have been modified according to circumstances of the ground provided the officers were fully alive to the requirements of the case.

As soon as the enemy's zone of fire was approached, deployment into line would have been effected, either from columns of march or masses; the advance would have been made by brigades, or divisions in line, with a second line at the distance equal to the front of two battalions or about 800 paces (assuming the battalion to be at its war strength), or the second line might have been formed by columns of half battalions.

The attack on Wörth itself might have been made in an echelon-formation from the centre, both wings refused. At enormous sacrifice of life, if the line formation had been adhered to, the enemy's artillery from Elsashausen, and its musketry from the enclosures of Wörth, playing upon the advancing lines, Wörth would have been taken by a gallant rush at last. Then the dangerous time would approach—descending the open slopes in long lines, attempting to gain successively the

* Since this was written, marked progress has taken place in the tactical instruction of the British Army, and the late orders on this head recognise the altered conditions of things.

† "Supports are not usually required in front of a line deployed, or of a line of "columns at deploying intervals." . . . "A reserve is only needed when a battalion "is skirmishing alone, or at some distance from the force it covers."—"Field Exer-"cise," 1870, p. 205.

ground on either side of Wörth on the enemy's line, by the echelon-movement, the loss of life would have been crushing, and perhaps even the staunchness of English soldiers would not have availed against the constant fire of the breech-loader. A desperate effort would be made to storm the heights; the favourite weapon of the British soldier, "cold steel," would be employed, but with what result? As they breasted the crest of the hill, the breech-loading fire of the enemy would receive them, never giving them a chance of closing and using the bayonet; a shattered remnant might succeed in gaining the shelter-trenches of the enemy, but only to be destroyed or driven back by the arrival of fresh troops.

The British General would have recognised the value of gaining the lower part of the Elsashausen Niederwald; but what formation would have been adopted in crossing the meadow-valley swept by fire so as to gain the wood with the least loss of life? The answer is scarcely provided for by our regulations. It would be idle to believe that at this point the Prussians shewed any peculiar tactical superiority. If the company column was employed, it was particularly unsuited, and the fact that here they lost 4,000 men proves not merely a desperate resistance by the French, but that the formations were such as to expose the troops unnecessarily to the French fire. Is it presumptuous to say that the only method by which to attack this important point would be by a concentric formation in extended order? so that up to the last moment the troops should be exposed as little as possible to the danger of a close formation, and yet after gaining the edge of the wood in strength and obtaining the protection its trees afforded, be successively reinforced and pushed on. The British Commander, presuming that the force at his disposal was not superior to that of the enemy, might have attacked the enemy's left through the woods, and would probably have succeeded in gaining the plateau of Neuweiler; but with the failure of the effort against the enemy's centre, this success would have been dangerous, and when the pressure on the centre was withdrawn, the enemy would have overwhelmed the right wing of the British Army.

There remains to be considered whether the artillery would have been sufficiently forward on the line of march to cover the deployment of the advanced guard, and in what formation it would have been posted, and whether the present so-called reserve artillery of a British Corps d'Armée would have been held in reserve, or employed early in the action.

Perhaps we may reply in the negative to the first point; to the second that if the British General and Commander of Artillery recognised that the ground was more favourable to the concentration of fire by massing guns, than by an attempt at dispersing the guns and concentrating the fire, the result would have been satisfactory to the British side, so far as regards the action of the artillery. On the other hand, perhaps the "reserve artillery" would answer to its title, and this important portion of the force, together with the reserves of infantry which would have been massed in a position of safety, would probably only have covered the withdrawal from an attack which

had failed in consequence of the shattering of the close formations adopted.

If we turn to the tactics which would have obtained in a defensive position such as the French held, the tactics which would have been employed by a British Commander whose mind was free from the modern innovations introduced by foreign nations in continental wars, we should possibly see errors less fatal than those we have ventured to allude to in the supposed attack upon the same position.

Just as the French Commander did, we should endeavour to line the crests of the hills with shelter-trenches. A company of 30 files could occupy a trench 62 feet long; we should try and hold every part of the line instead of the salient defending points, and sweeping the intervening spaces by fire, and, consequently, our line could not be of sufficient extent to prevent or withstand the flanking movements the enemy would adopt to avoid the sacrifice of life in frontal attacks. Our reserves would be massed too much, and would not be employed early enough for decisive effect, and the "artillery reserve" would be held unused until its fire would no longer conduce to a victorious result.

But here we may fairly suppose the aptitude of the British soldier to defensive fights would come into full play. Our artillery dispersed but concentrating fire, in the earlier phase of the battle would have done good service. In the later development of the fight it would have perhaps been massed, according to the direction of the enemy's line of attack. The tenacity of the troops, and the protection afforded by the shelter-trenches, would have enabled them to hold their ground, notwithstanding the severe fire of the enemy and the close formation of our troops. Then, if our flanks were still safe, we should be tempted by the repulse of the enemy to call on our men for an offensive effort. Springing from the shelter-trenches, and sweeping down the slopes in those grand red lines which have so often promised victory by their mere appearance, and which have so often fulfilled it gloriously, we should abandon our advantages, and give ourselves up to the murderous fire of the breech-loader. Slightly checked at first, the onward charge would slacken in speed and fail in numbers, and when we gained the hill where we hoped to find decisive victory, we should perhaps find instead only weakness of effort, or even disastrous defeat.

These may be considered too highly-coloured pictures of the attack and defence of a position such as Wörth by a British Army employing only the tactics which are taught in our authorised books. Let those who deem them to be so, study carefully the tactical instructions issued by Feldzeugmeister von Benedek to his troops in the year 1866, at the outset of the great struggle between his country and Prussia. Then let them turn to the numerous histories and accounts explaining the causes of the Austrian defeats, and they will find most surely that these were due to the close formations and implicit trust in the power of the bayonet, errors which were fatally intensified by the superiority of the Prussian arm.

It is beyond the intention and the abilities of the writer to attempt a full discussion of the tactical modifications which should be introduced in our service to suit the changes in the power of infantry and artillery fire.

The objects that we must keep in view, are the maximum development of our own fire, with the minimum exposure to the enemy's. In the attack, we must add to these, a necessary cohesion in order that our advance may be under control and that the soldier may be led and directed by his own officers. In the defence, this cohesion would generally be obtained by the nature of our attitude. The company column of the Prussians is well known. To a certain extent only it fulfils the conditions of the problem. The attack on the Geisberg at Weissenburg was made in the first instance by company columns, and was repulsed with great loss. The attack on St. Privat at the battle of Gravelotte, 18th August, 1870, was made in lines of company columns (in two lines), with skirmishers in front. In ten minutes the Prussian Guard lost 6,000 men, and the attack was broken off. It was only when the French ammunition was exhausted and the Saxon Corps turned the flank by Roncourt, and in concert with the re-formed Guard, advanced concentrically upon the position that St. Privat was taken.

The experience gained by the Prussians convinced them that "the attack in open order, joined to the attack of skirmishers, was adopted as the only efficacious one, and it was strictly forbidden to lead close bodies of troops within a nearer distance of the enemy's fire than 2,000 paces."

Up to a late date, the column was the formation used by continental armies in attack.

Against this it has been our privilege and pride to employ the line formation, and further than this, we are the only nation who received the charge of cavalry in that attitude. We have, therefore, some claim to having taken the initiative in adopting a thin formation.

The Englishman may turn with justifiable pride to the glowing pages of Napier to see the manner in which British soldiers, *less exposed* in their thin formation, but firm because of the training and national qualities, were enabled to *develop their fire to its fullest effect*, and then drive back the shaken enemy.

If then the qualities of our soldiers were such that they could, in those days, outvie other nations in their comparatively extended formation, which with the weapons of those times gave the maximum amount of fire and the minimum amount of exposure, can we not hope that we may still preserve our superiority by adhering to the spirit though not to the letter of those infantry tactics which have so often commanded the admiration of our bitterest foes. The change is inevitable. If ever we again engage a European foe, we shall not be able to sacrifice human life unnecessarily, as the Prussians did in the war of 1870–71, and yet reap the fruits of victory. Time and men will be wanting, and the sacrifice to Moloch will only forerun our own disaster and destruction. Peace is the breathing-time in the race for national existence.

We cling to the line-formation, as that in which British soldiers have fought and conquered; but if we do not in time of peace deeply ponder whether the changes of later years and the cruel experience of other nations have not made it imperative to modify the form while we adhere to the spirit, we shall have studied to no purpose, or have

thrown away those lessons which the bitterness of defeat may recall sharply but too tardily to our minds.

Let us then take the company at its war strength, and apply to that unit the principles of the Prussian company column. It would be far handier for a column formation, when cover permitted concentration, and when in extended order, would be more under the control and direction of its officers than the Prussian company, 250 strong. But if it be considered that this would make our unit too small, we might take the mean between the two. So long as an unwieldy unit is not adopted, the exact number is not important; all that we have to provide for is, that our organization in time of peace shall correspond with that we intend to adopt in time of war, both in tactics and in administration.

Trial under officers of tactical ability would soon teach us in our peace manœuvres exactly what strength of company was adapted to our power of obtaining cover and the necessary cohesion which must subsist between the companies of a battalion. British soldiers have hitherto advanced to attack in line, "shoulder to shoulder;" let them now be taught to manœuvre for attack in extended order in line; let the companies be instructed to form columns when cover permitted; again to open out for advance and fire-development at intervals between each file corresponding to twice the ordinary length of a man's arm, concentrating at the last moment for those attacks to gain certain points on a field of battle, which must now be mastered by a concentric fire and attack converging, and uniting at the point to be mastered, though not before.

It is not pretended to lay down how the exact formation of the company column should be effected. Indeed, the word column would almost be a misnomer. What we desire to shew is, that in the future, the British soldier should be taught to use the *close* line formation when the ground covers it, or even a species of column, if that be more applicable to the ground; that he should be instructed to open out for advance in extended order, alternately closing and opening out according to the requirements of ground and fire.

With the battalion, the instruction would tend to preserve the cohesion of movement required, so that we may govern the direction of our attacks.

We have not touched on the formation of a first skirmishing line. The value of skirmishers is well recognised in our service. Let those who are inclined to wonder that our tactics have made no great strides since the days of our Peninsular victories, and to give unqualified admiration to everything wearing a Prussian aspect, turn to their drill-books prior to 1861. There they will find that the value of skirmishing fire was systematically under-estimated, and that Prussian officers were taught to employ as *few skirmishers as possible*.

Our system of musketry instruction is excellent, but in this as in other things we seek too much to bring all to one level, rather than develop the aptitude of the few. The formation in each battalion of companies of marksmen is greatly to be desired, and we cannot doubt that the employment of these as skirmishers, creeping within musketry

range of the enemy's artillery, would be productive of important military results.

In wood-fighting, also, should our troops, regular and auxiliary, be constantly practised. Such a species of combat has developed itself to an extraordinary extent, and we should try and prepare by practice in our own land, so that however remote we may regard the possibility of its application in our island-country, we may be ready for what the future day may bring forth.

In defensive fighting we should teach ourselves the value of a less deep formation, and the extension of men to ground.

Our flanks covered by natural protection, or by field works, our shelter-trenches not continuous, but like the bastions of a fortification, and our men disposed in those trenches, in the proportion of one man per yard.

Our reserves drawn up, not in solid masses, but varying in formation to suit the ground, and ready to support any portion of the line; our artillery protected by gun-pits in positions favourable for concentration of fire; and our cavalry disposed so that they may be ready to undertake offensive action against shaken infantry; with these conditions may we not believe that in fighting a defensive action our military history will repeat itself, and that our soldiers tenaciously holding to the spirit of our old line-formation would repulse the attack of the most audacious foe, seizing victory when the shattering effect of their fire had overwhelmed the enemy, and advancing, as of yore, in lines which fulfilled the qualities of the old formation, while in their more extended order they partook of the change which years have brought about in the new order of things.

Fascinating as the subject is to the soldier, we feel that we have already far exceeded the limits of an essay; but before we leave this portion of the subject may we be permitted the remark, that in modern warfare as in the old, the physical education of the soldier requires the most careful attention. The physical attributes of the German soldier permitted them, after severe marches, to master the slopes of Wörth, and the steep heights of Spicheren. While we should be far from desiring that the soldier should be altogether relieved of his valise, may we suggest that sufficient margin should be allowed in transport, so that as soon as absolute contact with the enemy is foreseen, he might be rendered more capable of enduring the fatigue consequent on marching and battle, and the passage over ground in the swiftest manner?

In the autumn manœuvres, we might also see how our ammunition-columns answered to supply the regimental reserves in action by issuing only a few rounds to the men for an engagement, and when those few rounds were exhausted, by allowing them to be dependent upon the ammunition columns.

We cannot refrain from expressing a belief, that adherence to the spirit, while we reject the form, of our old close line-formation, is eminently suited to that army which must bear the brunt of a European contest, or of Oriential warfare. On the plains of India against an ill-armed or irresolute foe, the wise Commander would be

inclined to employ the closer formation in line, against the loosely-bound masses of an Eastern adversary. The occasion alone could decide the method of attack. In the little wars which Russia is now carrying on over the steppes of Central Asia, we are told that the defenders of the country are as little inclined to attack a line of skirmishers as a close formation. In a word, even in those remote regions, the truth has been appreciated, that with the new arms rapidity of fire supplies the place, and the close formation of numbers.

In artillery, so far as regards *matériel* and technical training, we have little to learn from foreign nations, while its tactical training, and the art of handling it on the field, will probably receive increased attention. It does require, however, greater stress to be laid on the necessity for extreme accuracy of fire. Slowness of fire, if accompanied by great accuracy, should be regarded as a virtue. We would go a step further, and say that it should be an accepted axiom that at drill, and with blank ammunition, not only should the guns be deliberately laid each time they come into action on objects whose range should be ascertained by a range-finder, or given by the subalterns of divisions, or Nos. I; but every operation should be performed save those connected with the fuze and projectile, which could only be undertaken at practice or in actual battle, and that even these should be impressed on the minds of all by the means of "motions."

That England ought to excel in her artillery is now a recognised axiom. The arguments against a powerful artillery are the encumbrance which it entails. Whether this evil cannot be greatly lessened by an increase in the number of guns in a battery, retaining the same number of non-fighting carriages (in which term we include all except guns, limbers, and ammunition waggons), is a point which may well be discussed by superior and experienced artillery officers.

In the cavalry much is being done to fit that arm for the requirements of the day. Those requirements, exemplified by the performance of the German cavalry during the war of 1870–71, are too well known now to need repetition here. A simplification and further lightening of the equipment may be found practicable. Our cavalry officers are not surpassed as horsemen by any body in the world. It only needs a mastery of subjects comprised under the heads, "Outpost duty," and "Reconnaissance," to render them superior to that of other nations in every respect.

Let us then freely learn the lessons which are so clear, that those who run may read. By attentive study of theory founded on the bloody experience of other armies, let us constantly practice to apply our theory to ground. Let us not hinder the military education of our troops by a retention of drill manœuvres, which waste valuable time to no purpose but those of show and parade.

First, let us try and continually practice our troops in small, as well as large bodies over as varied ground as circumstances will permit, and in accuracy and development of fire, and then we may fall back on the harmless exercises of the barrack-square.

It is not that our troops require less drill, but *more*—only drill on the parade and in the field used as means to an end, and not as the end itself.

Whether we shall see in action the great step towards sound military organization which has been proposed by the present War Minister, time alone will show. Even when this is carried out, much still remains to be done. It is not necessary that we should blindly copy a foreign model; we must adopt one suited to our national character, or it will fail. But unless we consent to form tactical units of command, and to decentralize our administration, our reforms in other directions will be of little value.

There are those—and we go far with them in admiration—whose worship of the German Army, which has achieved such great things, extends to the belief in the innate superiority of the German over the Frenchman. Let our minds travel back to the days of Jena and Auerstadt, and we shall find there a history we shall do well to apply to ourselves. Then, as in these times, a nation rushed blindly to arms, unassisted by allies, but confident in the patriotism of its people, and in the past glory achieved by its arms under a great warrior. Then, as now, the military Commanders were blind to the changes in tactics and organization which the march of time had hurried on; then, as now, they sought to cover ignorance by bravery.

Then followed, as in the year 1870–71, disaster upon disaster; the army became demoralized; then, as now, came the entry into a capital, a humiliating peace, a deprivation of provinces, an enormous indemnity burdening the exhausted country. In 1806 it was Prussia that fell a victim to its own blindness and the power of the French. In 1870–71 it was Prussia that made France pay the debt of revenge. History repeats itself with terrible exactness. England, and rightly, detests war. No ideas of foreign conquest or military glory obtain possession of our minds. We would have all the world be at peace. But not the less should England keep bright her sword for those evil days which may yet come, when she may have to fight for the widespread heritage bequeathed to us by our forefathers.

LECTURE.

Friday, May 23rd, 1873.

GENERAL THE RIGHT HONORABLE LORD STRATHNAIRN, G.C.B., G.C.S.I., in the Chair.

[*This paper was read by Captain Tyler, in the absence of Mr. Andrew from illness, and at his request.*]

THE EUPHRATES VALLEY ROUTE TO INDIA IN CONNECTION WITH THE CENTRAL ASIAN QUESTION.

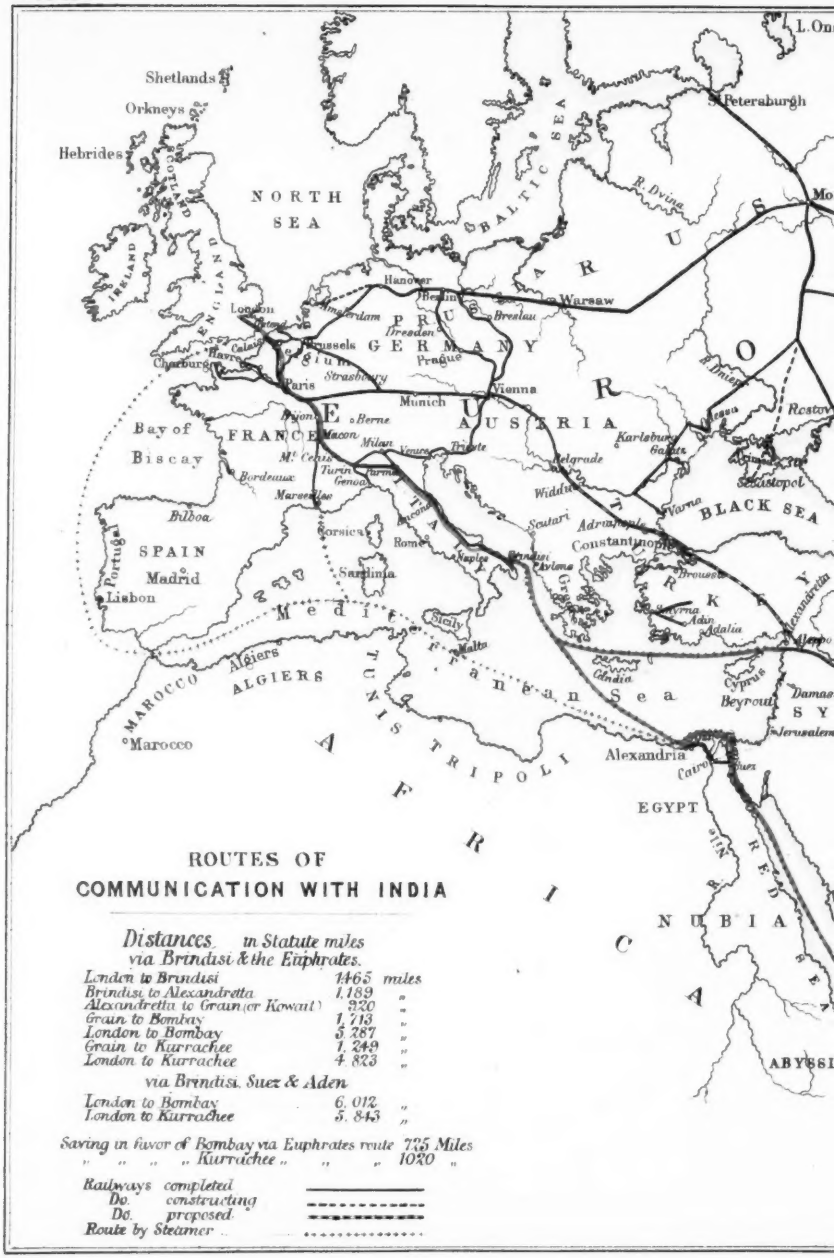
By W. P. ANDREW, Esq., F.R.G.S., Chairman, Scinde, Punjaub, and Delhi Railways.

[CAPTAIN TYLER: Mr. Andrew has for the last twenty years devoted much time and attention, and been at considerable expense, in advocating this route. I am sure therefore that the meeting will hear with interest all that he has entrusted me to deliver to it on the subject.]

AFTER a comparatively lengthened slumber, the Central Asian Question has recently again awakened into prominence. Seldom has the public mind,—I may say of Europe,—been so completely engrossed by a political question, owing its importance rather to the magnitude and uncertainty of the events to which it may at a future time give rise, than to its more immediate and palpable consequences.

Here in England it is not surprising that the recent portentous movements of Russia should excite men's minds, and fill us with apprehensions for the maintenance of our prestige in Europe and the safety of our Empire in the East. But while in our desire to avoid political complications we have devoted ourselves, with much assiduity, to the discussion of geographical questions affecting the boundaries of neutral States, we have overlooked the simplest and most obvious means of checkmating the possible designs of Russia by a parallel movement along the Valley of the Euphrates. It is right, therefore, at the present juncture, once more to invite attention to the proposed establishment of a direct and rapid route to our Eastern possessions by the ancient highway of the Euphrates.

In the proposal to restore this ancient route—once the highway of the world's commerce and the track of the heroes of early history—by the construction of a railway to connect the Mediterranean and the Persian Gulf, we have at hand an invaluable and perfectly efficient means at once of thwarting the designs of Russia, if they should assume



ROUTES OF COMMUNICATION WITH INDIA

Distances in Statute miles

via Brindisi & the Euphrates.

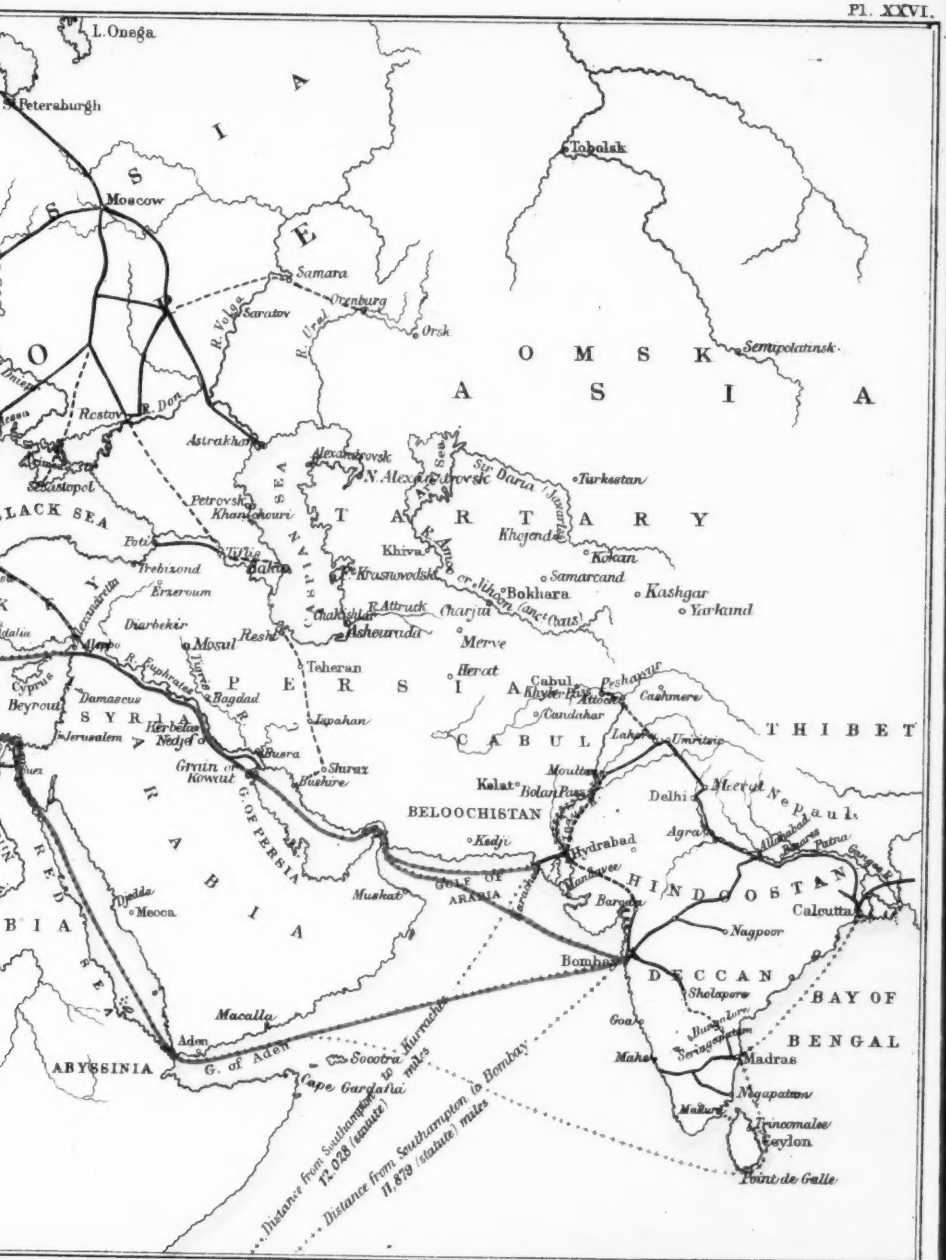
London to Brindisi	1465	miles
Brindisi to Alexandretta	1.189	"
Alexandretta to Grain (or Kowait)	220	"
Grain to Bombay	1.713	"
London to Bombay	5.287	"
Grain to Kurrachee	1.249	"
London to Kurrachee	4.823	"

via Brindisi. Suez & Aden

London to Bombay	6.012	"
London to Kurrachee	5.843	"

Saving in favor of Bombay via Euphrates route 735 Miles
" " " " Kurrachee " " " 1020 "

Railways completed ——————
Do. constructing - - - - - -
Do. proposed — — — —
Route by Steamer . . . . . .


L. Onega
St Peteraburgh
Moscow
Tobolsk
Samara
Orenburg
Saratov
R. Volga
R. Ural
Orsk
Semipolatinsk
O M S K
A S I A
Rostov
R. Don
Astrakhan
Alexandrovsk
N. Alexandrovsk
Sea of Aral
Str. Daria
Turkestan
Sebastopol
Petrovsk
Khanchkouri
T A R T A R Y
Khojend
Kokan
Khiva
Krasnuvodski
Samarcand
Bokhara
Kashgar
Yarkand
Trebizond
Erzeroum
Kars
Batoum
R. Attruck
Charjui
Merve
Diarbekir
Mosul
Reshd
Asheuruda
Teheran
Herat
Cabul
Peshawur
Cashmere
Candahar
Damascus
Bagdad
Ispahan
Beyrout
Jerusalem
Herbelas
Nedjd
Busra
Grain or Kowait
Shuraz
Bushire
Moultan
Kelat
Bolan Pass
Delhi
Meerut
Nepaul
BELOOCHISTAN
Kedji
Hydrabad
Agra
Allahabad
Patna
Ganges R.
Muscat
Gulf of Arabia
Baroda
Calcutta
Mocca
Nagpoor
Bombay
Macalla
Adem
Socotra
Goa
Sholapore
Seringapatam
Madras
Mahe
Negapatam
Maduro
Trincomalee
Ceylon
Point de Galle
Cape Gardafui
Distance from Southampton to Karrachee 7,028 (statute) miles
Distance from Southampton to Bombay 11,879 (statute) miles

J Jobbins

a hostile character; of marching hand in hand with her if her mission be to carry civilization to distant lands; and of competing with her in the peaceful rivalry of commerce.

On every ground, therefore, the proposed Euphrates Valley Railway is an undertaking eminently deserving our attention and the support and encouragement of our Government.

The countries which our future highway to India will traverse have been, from remote antiquity, the most interesting in the world. On the once fertile plains, watered by the Euphrates and Tigris, the greatest and most glorious nations of antiquity arose, flourished, and were overthrown. The earliest home of the genius of civilization—the scene of great events in the early history of the world—now shrouded in the dust of ages, or dimly discerned through the long vista of many centuries—the land of the Assyrians, Babylonians, and Chaldeans; where the daughters of Zion sat down and wept; where lay the track of Xenophon and his heroic 10,000 Greeks; the centre of the conquests of the Macedonians, where once stood the proud capitals of the Sassanides and of the Caliphs, now deserted and tenantless,—these regions must ever possess a fascination and interest for all mankind.

Somewhere on the banks of the Euphrates all scriptural commentators place the Garden of Eden. The second cradle of the human family was also upon that river, or its tributary, the Tigris. The first city of the new earth was built upon its banks. The tower of pride, erected by the post-diluvian population, cast a shadow over its waters. The Euphrates intersected Babylon, the "Golden City," the "Glory of Kingdoms;" the great capital of the Chaldean Empire; now a desolation among the nations—her broad walls utterly broken; her high gates burnt with fire. With Babylon are associated the names of Nebuchadnezzar and Belshazzar; of Daniel and Darius; of Cyrus and Alexander. The grand prophet of the captivity, and the energetic apostle of the new era, had their dwelling within her walls. Ere even a brick was made upon the Nile, Nineveh and Babylon must have had thriving and busy populations.

Twice in the world's history, mankind commenced the race of civilisation on the Mesopotamian Rivers. Twice the human family diverged from their banks to the east, the west, and the north. Arts and sciences made the first feeble steps of their infancy upon the shores of these rivers. Very early in history we know that Babylon was a great manufacturing city, famed for the costly fabric of its looms. At a more recent date the Chaldean kings made it a gorgeous metropolis, the fairest and the richest then on earth. Alexander of Macedon made it the port of the Indian Ocean and the Persian Gulf, and he proposed to render it the central metropolis of his empire.

The countries through which the Euphrates flows, were formerly the most productive in the world. Throughout these regions the fruits of temperate and tropical climes grew in by-gone days in luscious profusion. Luxury and abundance were universally diffused. The soil everywhere teemed with vegetation. Much of this has since passed away. Ages of despotism and misrule have rendered unavailing the bounty of nature. But the land is full of hidden riches. The natural

elements of its ancient grandeur still exist in the inexhaustible fertility of the country, and in the chivalrous character and bearing of many of the tribes; and the day cannot be far distant when it is destined to resume its place amongst the fairest and most prosperous regions of the globe.

The wondrous fertility of Mesopotamia was in early times carried to its utmost limit by means of irrigation canals, with which the country was everywhere intersected, and some of the largest of which were navigable. These excited the wonder and interest of Alexander the Great, who, after his return from the conquest of India, examined them personally, steering the boat with his own hand. He employed a great number of men to repair and cleanse these canals.

Herodotus, speaking of Babylonia, says, "Of all the countries I "know, it is without question the best and the most fertile. It pro- "duces neither figs, nor vines, nor olives; but in recompense, the earth "is suitable for all sorts of grain, of which it yields always 200 per "cent., and in years of extraordinary fertility as much as 300 per cent."

These regions need only again to be irrigated by the life-giving waters pouring down ever cool and plentiful from Ararat—that great land-mark of primæval history, now the vast natural boundary-stone of the Russian, Turkish, and Persian empires—to yield once more in abundance almost everything that is necessary or agreeable to man. Many acres now wasted, save when in early spring they are wildernesses of flowers, may be covered with cotton, tending to the employment of the million spindles of our land.

It is not too much to say, that no existing or projected railroad can compare in point of interest and importance with that of the Euphrates Valley. It will bring two quarters of the globe into juxta-position, and three continents, Europe, Asia, and Australia, into closer relation. It will bind the vast population of Hindustan by an iron link with the people of Europe. It will inevitably entail the colonisation and civilisation of the great valleys of the Euphrates and Tigris, the resuscitation in a modern shape of Babylon and Nineveh, and the re-awakening of Ctesiphon and Bagdad of old.

Where is there in the world any similar undertaking which can achieve results of such magnitude, fraught with so many interests to various nations? And who can foresee what ultimate effects may be produced by improved means of communication in the condition of Hindoos, Chinese, and other remote peoples?

It is by distance and difficulties of intercourse that the distinctions of creeds and races are chiefly upheld. Annihilate space, and the great barriers that separate peoples—the differences of manners and customs, of modes of thought and feeling, of doctrines and dogmas, of precepts and prejudices, that keep up these barriers—gradually disappear, as barbarism, superstition, and ignorance give way to the superior and irresistible force of civilisation, truth, and enlightenment.

Although various routes have been suggested with the view of bringing Great Britain, by means of railway communication, into closer connection with India and her other dependencies in the East, and of securing at the same time the immense political and strategic deside-

ratum of an alternative highway to our Eastern possessions, there is none which combines in itself so many advantages as the ancient route of the Euphrates; the route of the Emperors Trajan and Julian, in whose steps, in more recent times, the Great Napoleon intended to follow, when the Russian campaign turned his energies in another direction.

The special advantages which render this route superior to all others, are briefly these:—It is the direct route to India. It is the shortest and the cheapest, both for constructing and working a railway; so free from engineering difficulties, that it almost appears as though designed by the hand of nature to be the highway of nations between the east and the west; the most surely defensible by England—both of its termini being on the open sea; and the most likely to prove remunerative.

Both in an engineering and a political point of view, the Euphrates route undoubtedly possesses great advantages over any of the others which have been proposed. All the routes which have been suggested from places on the Black Sea, are open to the fatal objection, that while they would be of the greatest service to Russia, they would be altogether beyond the control of Great Britain, while the engineering difficulties with which they are surrounded are of themselves sufficient to exclude them from practical consideration.

This has been fully established by the evidence of the witnesses examined by the Select Committee of the House of Commons, which lately investigated the merits of the various proposals for connecting the Mediterranean and the Black Sea with the Persian Gulf.

In the course of the investigation by the Committee, it was demonstrated that the proposed Euphrates Valley Railway is an eminently feasible undertaking in an engineering sense; that the route of the Euphrates and the Persian Gulf is decidedly preferable in respect of climate to that by Egypt and the Red Sea; that as regards the safety and facility of the navigation the Persian Gulf also has by far the advantage; that the proposed undertaking would be of great commercial moment, and if not immediately profitable, at all events that it would be so at a date not far distant; and finally, that it would be of the highest political and strategic importance to this country.

It is unnecessary to quote in detail from the evidence taken by the Committee, but in order to show how authoritative were the conclusions in favour of the undertaking at which the Committee arrived, I may state that the engineering facilities which exist for the construction of a railway from the Mediterranean to the Persian Gulf were demonstrated by the evidence of the late General Chesney, the veteran explorer of the route, by Captain, now Admiral Charlewood, of the Royal Navy, and Mr. W. F. Ainsworth, two of the officers attached to the Euphrates Expedition; by Sir John Macneill, Mr. Telford Macneill, Mr. W. J. Maxwell, Sir Henry Rawlinson, Captain R. F. Burton, and Captain Felix Jones. The advantages of the route, in respect of the climate and productiveness of the country to be traversed, were shown by the evidence of General Chesney, Mr. Eastwick, M.P., Captain Felix Jones, Colonel Sir Henry Green, Colonel Malcolm Green, Mr. Consul Barker,

and others. Mr. Barker, who has resided twenty-six years as Vice-Consul and Acting Consul at Seleucia, Antioch, and Aleppo, and has perhaps as intimate an acquaintance with the country as any man living, stated in an official report, addressed by him last year to Lord Granville, that—

"A railway through Mesopotamia, as a route to India, would not at "first be productive of much income to a company from traffic, but in "a few years—certainly before the railway could be finished—the "cultivation of grain would increase a hundredfold, and would go on "increasing a thousandfold, and would attain to a magnitude and "extension quite impossible to calculate, because bad harvests are "almost unknown in these parts, for there is always plenty of rain and "a hot sun to ripen the corn. Populous villages would spring up all "along the line, as there is abundance of sweet water everywhere. "Cereals can be grown there so cheaply that no country the same dis-"tance from England—say, for instance, Russia—could compete with "it at all. And if Great Britain finds it necessary to rely more on the "importation of foreign corn, where could a better field be found than "the fertile plains of Mesopotamia, the cradle of mankind, which has "all the advantages of climate, soil, sun, and water, in its favour?"

The facility of the navigation of the Persian Gulf was testified to by Mr. William Parkes, Consulting Engineer to the Secretary of State for India for Kurrachee harbour, and by Mr. Edwyn Dawes, and also, in a correspondence published a short time since, by Captain A. D. Taylor, late of the Indian Navy.

The advantages of the proposed undertaking from a military point of view were placed beyond question by the evidence of General Chesney, of Captain Tyler, and of those experienced soldiers, Sir Henry and Colonel Malcolm Green, and more especially by the weighty testimony of Lord Strathnairn; while its importance in a political sense was established by many witnesses, amongst whom I may instance Sir Bartle Frere, the late lamented Sir Donald McLeod, Mr. Palgrave, Colonel Herbert, Her Majesty's Consul-General at Bagdad, Mr. Eldridge, Consul-General at Beyrout, and, pre-eminently, the "Great Elchi," the venerated Lord Stratford de Redcliffe.

Other nations, whose interests in the East are incomparably less than ours, either on political or commercial grounds, have in recent years made great advances in extending their communications in an easterly direction.

The establishment of steam communication by the "Messageries Maritimes" on the route of the Red Sea to Calcutta and other Eastern ports shows the importance attached by the French to the extension of their commercial relations with the East. A Russian line of steamers also, has lately been established, to run between Odessa and Bombay by the route of the Suez Canal. Even those who see no danger in the policy of annexation pursued by Russia, will admit that the Russian roads and railways now being pushed towards Persia and Affghanistan, if designed with pacific intentions, prove, at all events, the anxiety of the Russian Government to compete with us for the trade of Central Asia, the Punjaub, and Northern India. But the carriages and trucks

ostensibly designed for peaceful and commercial purposes are so constructed, under the special instructions of the Russian Government, as to be equally available for the conveyance of troops and munitions of war. We must not, therefore, stand still in the career of improvement, and be left behind in the race by other nations, however friendly. Political disturbance in Europe might at any moment deprive us of our communications with India *viâ* Egypt.* So long as the Indian Empire subsists, the connection between India and this country must be kept up. If that connection were interrupted for many months, the doom of our Eastern Empire might be practically sealed. England maintains her position in India mainly by force of arms; and it is a principle both of war and of common sense to take the most efficient means at our command to keep open the lines of communication between the base and the field of operations. Hence the necessity of establishing an alternative route, even if it were not a better one. But that by the Euphrates, the most ancient of all, is at once the shortest, the easiest, and the safest, and it can never be superseded by any other offering superior advantages.

Apart from the general question of the advantage on strategic grounds of possessing an alternative and accelerated route to our Eastern dominions, it is a matter of the greatest importance that, in case of an emergency, we should be able to send troops to India at any season of the year. Viewed in this light, the Euphrates route presents a striking contrast to that *viâ* Egypt, which, during a portion of the year, could not be used for the transport of troops without a serious sacrifice of life in consequence of the excessive heat of the Red Sea. The Euphrates route, on the other hand, would be available for this purpose at all seasons.

In addressing such an audience as the present, it would be superfluous to dilate on the importance, in a military point of view, of an undertaking which would reduce the journey between England and India by several days.

The substitution of Kurrachee for Bombay as the European port of India would, even by the Red Sea route, give us an advantage of some 500 miles; but if the Euphrates route were once established, the adoption of Kurrachee as the European port of India would necessarily follow, and India would thus be brought upwards of 1,000 miles nearer to us than at present; while, during the monsoon months, the gain would be still greater, as the route between the Persian Gulf and Kurrachee is not exposed to the severity of the monsoon, which it is well known, renders a divergence of some 500 miles necessary during a portion of the year on the voyage from Bombay to Aden.

When the railway system of the Indus is completed, Kurrachee will be in continuous railway communication with Calcutta, and with the gates of Central Asia at the Khyber and Bolan Passes, and it will thus become the natural basis of operations in the event either of any internal commotion in India, or of aggression on our north-western frontier.

* "The (Suez) canal can be closed with great ease, either by sinking a ship in the "channel, or by blowing in the sides at two or three points where the banks offer "peculiar facilities for hasty demolition."—(Capt. Wilson, R.E., *vide* page 496.)

If I may repeat the words which I ventured to urge upon Lord Palmerston upwards of sixteen years ago, when I accompanied, in support of the Euphrates Valley Railway, one of the largest and most influential deputations that ever waited upon a Minister, "the grand "object desired, is to connect England with the north-west frontier of "India by steam-transit through the Euphrates and Indus Valleys. "The latter will render movable to either the Khyber or the Bolan, "the two gates of India, the flower of the British Army cantoned in "the Punjaub; and the Euphrates and Indus lines being connected by "means of steamers, we should be enabled to threaten the flank and "rear of any force advancing through Persia towards India. So that "by this great scheme, the invasion of India would be placed beyond "even speculation, and it is evident that the great Army of India of "300,000 men being thus united to the Army of England, the mutual "support they would render each other, would quadruple the power "and ascendancy of this country, and promote powerfully the progress, "the freedom, and the peace of the world."

The Euphrates and Indus lines together would, moreover, secure for us almost a monopoly of the trade with Central Asia, enabling us to meet Russia, our great competitor in these distant fields of commercial enterprise, on more than equal terms.

But it is not on commercial considerations that I would urge the claims of the Euphrates Valley Railway. It is on imperial grounds that the scheme commends itself to our support. I believe that the establishment of the Euphrates route would add incalculably to our prestige throughout Europe and the East, and would do more to strengthen our hold on India than any other means that could be devised.

On the ground of the great importance to India of being placed in continuous railway communication with Europe, some persons of an ambition too lofty and impatient to pay much regard to the considerations which weigh with more practical advocates of railway enterprise, would be content to support nothing short of a through-line from Constantinople to India.

Although fully alive to the vast importance of the results which would accrue, not only to England and India, but to the cause of civilization generally, from the establishment of continuous railway communication between Europe and India, I cannot conceal from myself that such a project is too vast to be at once undertaken with any hope of success. But the Euphrates Valley Railway as proposed from the Gulf of Scanderoon to the Persian Gulf, has been specially designed with a view to its ultimately forming part of a through-line from Constantinople to the head of the Persian Gulf, while it is capable also of being, in due time, extended eastwards to Kurrachee, the port of India nearest to Europe. The line from the Mediterranean to the Persian Gulf has been demonstrated to be eminently practicable and easy, which the other portions of the route between Constantinople and India are not. While capable of forming part of a through-line, it would at the same time be complete in itself, and independent of any disturbances in Europe—the only portion, in fact,

of a through-line of railway which would be always, and under all circumstances, at the absolute control of this country. It would always be to this country the most important portion of any through-line; and indeed I believe a through-line could not be constructed, except at overwhelming cost, without the assistance of a port in northern Syria. It would, moreover, provide us with a complete alternative route to India, and would thus at once secure to this country advantages admitted to be of the highest national moment. It is for these reasons that during the long period in which I have devoted myself to the advocacy of the Euphrates route to India, I have thought it expedient to urge upon our own Government and that of Turkey, the special claims of that section only which would connect the Mediterranean with the Persian Gulf.

The objection that, although the Euphrates Valley Railway would afford us the undoubted advantage of an alternative, a shorter, and a more rapid means of communication with India, it would still leave a considerable portion of the journey to be accomplished by sea, and that consequently it would accelerate our communications with the East in a minor degree only, is sufficiently disposed of by the circumstance already pointed out,—that a railway from a point on the Mediterranean, at or near Scanderoon, to the head of the Persian Gulf, would naturally form part of a through-line of railway from Constantinople to India, if at a future time it should be considered necessary or desirable to construct the remaining sections.

At the same time it is to be observed, that any possible acceleration of the journey between Europe and India, by the substitution of railway for sea transit, would be, relatively, much less in the case of those portions of the route traversing Asia Minor on the one hand, and Persia and Affghanistan, or Beloochistan, on the other, than on the central section between Scanderoon and the Persian Gulf; the latter section being almost level for nearly the whole distance, and therefore capable of being traversed at a very high rate of speed; whereas, both in Asia Minor and Persia, the gradients would be so severe as to neutralize in a great measure the advantages ordinarily attaching to railway travelling as compared with that by sea. *Pro rata* to the power required, so is the distance. In other words, the proposed Euphrates Valley Railway would take advantage of precisely that portion of the route between Constantinople and India, where the greatest benefit would be derivable from the substitution of railway for sea transit, whether regard be had to the rate of speed attainable, or to the economy with which the traffic might be worked.

A regular mail service being already in operation on the maritime portions of the Euphrates route to India—maintained on the Mediterranean side by French steam-packets calling at Alexandretta, and between the ports of the Persian Gulf, and Kurrachee and Bombay, by the vessels of the British India Steam Navigation Company—a railway of little more than 900 miles in length from Scanderoon (or Alexandretta), on the Mediterranean, to Kowait (or Grain), on the Persian Gulf, is all that is required to secure for us the immense political and strategic advantage of a complete alternative route to

India; a shorter and more rapid route than now exists; and one, moreover, which compares very favourably with the Red Sea route, both as regards climate, and the facility and safety of the navigation.

Both Alexandretta and Kowait, the proposed termini of the railway, possess all the requisites of first-class harbours.

The harbour of Alexandretta is one of great capacity; sufficient, according to Sir John Franklin, Admiral Beaufort, and others, to contain the whole Navy of Great Britain. It is the safest harbour on the coast of Syria, and might be made available for the purposes of the railway at a very small outlay. The place is at present open to some objection on account of unhealthiness; but this, its only disadvantage, might be entirely obviated by drainage, at a moderate expenditure.

With regard to the harbour of Kowait, near the head of the Persian Gulf, Mr. William Parkes, C.E., the Consulting Engineer to the Secretary of State for India for Kurrachee harbour, who by the liberality of the Indian authorities, was recently enabled to examine the ports in the Persian Gulf, states in an able report addressed to me on the subject, that "nothing could be more secure or favourable in any "way" (than Kowait) "for ships of the largest size, whether to ride "at anchor, or to be moored alongside a quay wall." As a place for landing and embarking passengers, mails, and cargo, even without sea works more extensive than a short jetty to bring a steam tender alongside, Mr. Parkes reports that Kowait "is superior to Alexandria (as it "is, until the new works are completed), to Suez (as it was three "years ago), and to Bombay; while for an expenditure of from 80,000*l.* "to 100,000*l.*, a wharf of sufficient length to berth four steamers, of "3,000 tons each, might be constructed, and the railway brought down "upon it, thus placing Kowait on a par, in this respect, with Suez as "it is, Brindisi, or Dover." Kowait is already one of the most important towns in the gulf, and according to Captain A. D. Taylor, late of Her Majesty's Indian Navy, possesses more baghalahs, or boats of the country, than any other port in the gulf which trades with India; and there can be no doubt, if it be adopted as the eastern terminus of the railway, it will, within a very short period, have an enormous trade of its own, irrespective of the through traffic passing over the railway.

As regards the route which the railway should take between Alexandretta and the Persian Gulf, it is to be borne in mind, that the great and primary object of the undertaking is the connection of the Mediterranean Sea and the Persian Gulf by railway; and the necessity for such a connection having been once established, the precise line which the railway should take, would appear to be comparatively a matter of less vital importance. I may observe, however, that passing in the first place from Alexandretta, the proposed terminus on the Mediterranean, to Aleppo, the present metropolis of Syria, and a great entrepôt of trade, the route from that place to the Persian Gulf, which has much the strongest arguments in its favour, would appear to be that recommended by Captain Felix Jones, which keeps on the right bank of the Euphrates for the whole distance, beyond the reach of inundations, and passes by way of Annah, Hit (the Is of Herodotus), the holy cities of

Kerbela and Nedjef (or Meshed Ali), Semárwah, and Súk-esh-Sheyukh to Kowait or Grain, on the Persian Gulf.* This line would pass not many miles from Bagdad, the city of the Caliphs, a household word with us from the time we read of the doings of Haroon al Rashid in the "Arabian Nights." Bagdad, and the neighbouring holy cities of Kerbela and Nedjef, are frequently chosen by Sheeah Mahomedans as a residence, that they may be buried by the side of Hoosein, their favourite saint, whose tomb at Kerbela is the peculiar object of their veneration, and is annually bedewed with the tears of thousands. Nedjef, the burial place of Ali, though of inferior sanctity, is also held in great veneration. Pensioners of the Government of India, natives of the highest rank, frequently make Bagdad or Kerbela their adopted home; and both from Persia and Hindustan, untold wealth has been poured into the coffers of the priests of Kerbela.

The route which I have traced from Alexandretta to the Persian Gulf, besides being probably the shortest line obtainable, would obviate altogether the necessity and expense of crossing the Euphrates. This line, moreover, regarded from a strategic point of view, would give the advantage of the interposition of two great rivers between the railway and an enemy advancing on the flank on which there would be the greatest likelihood of attack.

The cost of the proposed railway, according to the estimates of competent engineers, would be under nine millions sterling; and His Excellency, Musurus Pasha, the Turkish Ambassador, has officially intimated the readiness of his Government to raise the requisite funds by means of an Ottoman loan, under conditions specially favourable to this country,† if Great Britain will give a counter-guarantee, as she

* It was originally proposed that Bussorah, at the head of the Persian Gulf, should be the eastern terminus of the railway, but from the evidence taken by the recent Select Committee of the House of Commons, it would appear that Kowait would be the most suitable terminus.

† The following are the conditions referred to:—

1. The funds required for the construction of the railway, to be raised by means of an Ottoman Loan, the interest of which to be counter-guaranteed by England at the rate of 4 per cent. per annum, and 1 per cent. for a sinking fund.

2. The proceeds of such loan, when raised, to be deposited in the Bank of England in the names of a mixed committee to be appointed jointly by the English and Turkish Governments, and to be applied by them exclusively for the construction of the railway, and the provision of the necessary rolling stock, and for no other purpose.

3. All the land necessary for the railway, and for all the works in connection therewith, to be provided free by the Turkish Government.

4. In order to secure, with regularity and certainty, the payment of the interest upon the loan, the following stipulations to be agreed upon and enforced:

(1st.) The net income proceeds of the working of the railway when made, wholly or in part of it, to be paid into the Bank of England, and applied exclusively to the payment of the interest and the sinking fund.

(2nd.) The customs duties and port charges of the ports of Alexandretta and Bussorah, as well as certain revenues and other resources of the provinces through which the railway may pass, to be assigned by the Turkish Government to the mixed committee as a security for the payment of the interest of the loan, and of the sinking fund.

5. The Turkish Government to guarantee to England the privilege of the conveyance of troops at all times by the railway to and from this country, and any of Her

India; a shorter and more rapid route than now exists; and one, moreover, which compares very favourably with the Red Sea route, both as regards climate, and the facility and safety of the navigation.

Both Alexandretta and Kowait, the proposed termini of the railway, possess all the requisites of first-class harbours.

The harbour of Alexandretta is one of great capacity; sufficient, according to Sir John Franklin, Admiral Beaufort, and others, to contain the whole Navy of Great Britain. It is the safest harbour on the coast of Syria, and might be made available for the purposes of the railway at a very small outlay. The place is at present open to some objection on account of unhealthiness; but this, its only disadvantage, might be entirely obviated by drainage, at a moderate expenditure.

With regard to the harbour of Kowait, near the head of the Persian Gulf, Mr. William Parkes, C.E., the Consulting Engineer to the Secretary of State for India for Kurrachee harbour, who by the liberality of the Indian authorities, was recently enabled to examine the ports in the Persian Gulf, states in an able report addressed to me on the subject, that "nothing could be more secure or favourable in any "way" (than Kowait) "for ships of the largest size, whether to ride "at anchor, or to be moored alongside a quay wall." As a place for landing and embarking passengers, mails, and cargo, even without sea works more extensive than a short jetty to bring a steam tender alongside, Mr. Parkes reports that Kowait "is superior to Alexandria (as it "is, until the new works are completed), to Suez (as it was three "years ago), and to Bombay; while for an expenditure of from 80,000*l.* "to 100,000*l.*, a wharf of sufficient length to berth four steamers, of "3,000 tons each, might be constructed, and the railway brought down "upon it, thus placing Kowait on a par, in this respect, with Suez as "it is, Brindisi, or Dover." Kowait is already one of the most important towns in the gulf, and according to Captain A. D. Taylor, late of Her Majesty's Indian Navy, possesses more baghalahs, or boats of the country, than any other port in the gulf which trades with India; and there can be no doubt, if it be adopted as the eastern terminus of the railway, it will, within a very short period, have an enormous trade of its own, irrespective of the through traffic passing over the railway.

As regards the route which the railway should take between Alexandretta and the Persian Gulf, it is to be borne in mind, that the great and primary object of the undertaking is the connection of the Mediterranean Sea and the Persian Gulf by railway; and the necessity for such a connection having been once established, the precise line which the railway should take, would appear to be comparatively a matter of less vital importance. I may observe, however, that passing in the first place from Alexandretta, the proposed terminus on the Mediterranean, to Aleppo, the present metropolis of Syria, and a great entrepôt of trade, the route from that place to the Persian Gulf, which has much the strongest arguments in its favour, would appear to be that recommended by Captain Felix Jones, which keeps on the right bank of the Euphrates for the whole distance, beyond the reach of inundations, and passes by way of Annah, Hit (the Is of Herodotus), the holy cities of

Kerbela and Nedjef (or Meshed Ali), Semárwah, and Súk-esh-Sheyukh to Kowait or Grain, on the Persian Gulf.* This line would pass not many miles from Bagdad, the city of the Caliphs, a household word with us from the time we read of the doings of Haroon al Rashid in the "Arabian Nights." Bagdad, and the neighbouring holy cities of Kerbela and Nedjef, are frequently chosen by Sheeah Mahomedans as a residence, that they may be buried by the side of Hoosein, their favourite saint, whose tomb at Kerbela is the peculiar object of their veneration, and is annually bedewed with the tears of thousands. Nedjef, the burial place of Ali, though of inferior sanctity, is also held in great veneration. Pensioners of the Government of India, natives of the highest rank, frequently make Bagdad or Kerbela their adopted home; and both from Persia and Hindustan, untold wealth has been poured into the coffers of the priests of Kerbela.

The route which I have traced from Alexandretta to the Persian Gulf, besides being probably the shortest line obtainable, would obviate altogether the necessity and expense of crossing the Euphrates. This line, moreover, regarded from a strategic point of view, would give the advantage of the interposition of two great rivers between the railway and an enemy advancing on the flank on which there would be the greatest likelihood of attack.

The cost of the proposed railway, according to the estimates of competent engineers, would be under nine millions sterling; and His Excellency, Musurus Pasha, the Turkish Ambassador, has officially intimated the readiness of his Government to raise the requisite funds by means of an Ottoman loan, under conditions specially favourable to this country,† if Great Britain will give a counter-guarantee, as she

* It was originally proposed that Bussorah, at the head of the Persian Gulf, should be the eastern terminus of the railway, but from the evidence taken by the recent Select Committee of the House of Commons, it would appear that Kowait would be the most suitable terminus.

† The following are the conditions referred to:—

1. The funds required for the construction of the railway, to be raised by means of an Ottoman Loan, the interest of which to be counter-guaranteed by England at the rate of 4 per cent. per annum, and 1 per cent. for a sinking fund.

2. The proceeds of such loan, when raised, to be deposited in the Bank of England in the names of a mixed committee to be appointed jointly by the English and Turkish Governments, and to be applied by them exclusively for the construction of the railway, and the provision of the necessary rolling stock, and for no other purpose.

3. All the land necessary for the railway, and for all the works in connection therewith, to be provided free by the Turkish Government.

4. In order to secure, with regularity and certainty, the payment of the interest upon the loan, the following stipulations to be agreed upon and enforced:

(1st.) The net income proceeds of the working of the railway when made, wholly or in part of it, to be paid into the Bank of England, and applied exclusively to the payment of the interest and the sinking fund.

(2nd.) The customs duties and port charges of the ports of Alexandretta and Bussorah, as well as certain revenues and other resources of the provinces through which the railway may pass, to be assigned by the Turkish Government to the mixed committee as a security for the payment of the interest of the loan, and of the sinking fund.

5. The Turkish Government to guarantee to England the privilege of the conveyance of troops at all times by the railway to and from this country, and any of Her

has already done, jointly with France, in the case of an Ottoman loan raised in 1854.

The opening up of the Euphrates route would afford an additional guarantee for the integrity of the Ottoman Empire, and would tend in a great measure to a peaceful solution of the Eastern question. The proposed railway would consolidate the dominions of the Porte, by bringing the ancient Pachaliks of Aleppo and Bagdad into closer communication with the seat of Government. The grand impediment to the improvement of the Sultan's dominions is the want of means of intercommunication; and no line would promote more effectually their good government and prosperity, or do more to develop their really prodigious resources than that which would lay open to the energy and capital of the emigrant and merchant of the West, the extensive and fertile plains of the Euphrates and Tigris.

I believe that by co-operating with our ally the Sultan in this work of progress, we should run infinitely less risk of unfortunate complications than by the task we have lately undertaken of determining the political geography of Central Asia; while we should do much to cement our alliance with a Power whose friendship it will always be incumbent on us to maintain if we would rule in security over a population composed, as that of India is, largely of Mahomedans.*

Let me recall for a moment to your recollection the political inheritance bequeathed by Peter the Great to his successors, in his will. "We "must," says that remarkable document, which first became publicly known in 1837, "incessantly extend ourselves towards the north, the "Baltic Sea, and towards the south, the Mediterranean.

"We must advance as much as possible towards Constantinople and "India. Whoever shall reign there will be the true masters of the "world. Therefore we must face continual wars, sometimes with "Persia; create dockyards and emporiums on the Black Sea; take "possession, little by little, of that sea, as well as of the Baltic, which "is a point doubly necessary for the success of the plan; hasten the "downfall of Persia; advance into the Gulf of Persia, as far as can "be done, re-establish through Syria the ancient commerce of the East, "and enter into the two Indies, which are the stores of the world. "When once there, we can do without the gold of England."

Majesty's Eastern possessions, and at a rate not exceeding that which will be paid for the conveyance of troops belonging to the Ottoman Empire, and upon such other conditions and regulations as shall be settled and agreed upon by a convention between the English Government and the Sublime Porte.

6. The transport, free of any charge, at all times by the railway of all English mails to and from this country, and any of Her Majesty's Eastern possessions.

7. Until the extinction of the loan by repayment of the principal and interest, the English Government, and the bondholders as represented by the committee, to have an absolute mortgage upon the railway, and land, and works.—(*Vide Report of Select Committee of the House of Commons, dated the 22nd July*, 1872.)

* To Persia also, as well as Turkey, the opening up of the Euphrates route would be of the highest importance, as it would give her access to a port on the Mediterranean, and would thus relieve her from the predominating influence of Russia, to which her isolated position renders her specially liable, the Black Sea being at present almost the sole channel of her commercial intercourse with Europe.—W. P. A.

How methodically and steadily, if slowly, the task enjoined upon his successors by Peter the Great has been pursued, let history attest.

The old southern boundary of Russia in Central Asia extended from the Ural, north of the Caspian, by Orenburg and Orsk, to the old Mongolian city of Semipolatinsk, and was guarded by a cordon of Cossack outposts. In 1716, Peter the Great sent a force commanded by Prince Bekovich, to take possession of part of the eastern shore of the Caspian. Three forts were then built, though subsequently abandoned, after an unsuccessful expedition against the Khivans. More recently, since 1834, Russia has succeeded in firmly establishing herself on the eastern shore of the Caspian, where she has now four permanent posts, Fort Alexandrovsk, Krasnovodsk, at the mouth of the Balkan Gulf, Chikishlar, at the mouth of the Atreck, and the Island of Ashurada. To the east she has crossed the Kirghis Steppe and established herself on the Sir Daria or Jaxartes, which Admiral Boutakoff is said to have navigated for 1,000 miles in 1863. Thus the Russian frontier in Central Asia has been pushed forward until her advanced posts on the east look down from the Tian Shan range upon the plains of Chinese Turkestan. In Western Turkestan also, she has gradually extended her boundary, and has annexed or subjected Tashkend, Kokand, Khojend, Samarcand, and Bokhara. In thus pursuing her career of annexation, Russia but follows the natural policy of a great military empire, being forced moreover, as Sir John Malcolm said, by an impelling power which civilization cannot resist when in contact with barbarism. Assuming as there is every reason to do, that the Khivan Expedition will be successful, and that Khiva will be subjugated, it is highly improbable that Russia, whatever be her present intention, will be able again to evacuate the country. To do so would be looked upon as a defeat and would compromise her prestige in Central Asia. She may indeed stop short of absolute annexation, but there can be little doubt that she will at least bring Khiva under the same yoke as Bokhara, and she will thus establish her influence on the Oxus, as she has already established it on the Jaxartes. The Oxus, or Amu Daria, is a noble river, not easy of navigation, but, it is believed, capable of being made so. It will furnish a ready means of carrying the tide of Russian annexation eastward until it finds a barrier in the Hindoo Koosh. When Russia shall have established herself along the Oxus, her position will be at once menacing to Persia and India. From Chardjuy on the Oxus there is a road to Merv, distant about 150 miles, and from Merv a direct road runs along the Valley of the Murghab to Herat, the "key of India." Merv is historically a part of the Persian Empire, but in these countries it is notoriously difficult to define boundaries with any precision. Should Russia succeed in occupying Merv, as there is too much reason to fear she ultimately will, and in converting the neighbouring tribes into friends or allies, her position would be one which we could not regard without the gravest apprehension.

Surely in the face of such facts as these, the time has arrived when England should rouse herself from the apathy of the past, and take steps to secure the incalculable advantages which would accrue to her-

self and her Eastern dependencies from the opening up of the Euphrates route.

The military and political value of the Euphrates line is a matter of extreme moment, and has a far more decided bearing on the defence, not only of Turkey but of Persia and the whole district lying between the Mediterranean, the Caspian, and the Indian Ocean than might at first be supposed.

So long ago as 1858, Field-Marshal Lieutenant Baron Kuhn von Kuhnenfeld, Austrian War Minister, predicted that Russia would in future probably try to satisfy her craving for an open seaboard by operating through Asia.

"She will not," says this distinguished authority, "reach the shores of "the Persian Gulf in one stride, or by means of one great war. But "taking advantage of continental complications, when the attention and "energy of European States are engaged in contests more nearly con- "cerning them, she will endeavour to reach the Persian Gulf step by "step, by annexing separate districts of Armenia, by operating against "Khiva and Bokhara, and by seizing Persian provinces. * * * *

"The most important lines which Russia must keep in view for "these great conquests are,

"1. The line from Kars to the Valley of the Euphrates and Meso- "potamia.

"2. That from Erivan by Lake Van to Mossul in the Valley of the "Tigris, to Mesopotamia and thence, after junction with the first line, "to Bagdad.

"3. That from Tabreez to Schuster in the Valley of the Kercha, "where it joins.

"4. The road leading from Teheran by Ispahan to Schuster and "thence to the Persian Gulf. * * * *

"Once in possession of the Euphrates, the road to the Mediterranean, "*viâ* Aleppo and Antioch, and to the conquest to Asia Minor and Syria "is but short.

"It is clear that all these lines are intersected by the line of the "Euphrates, which, running in an oblique direction from the head of "the gulf north of Antioch to the Persian Gulf, passes along the "diagonal of a great quadrilateral which has its two western corners on "the Mediterranean, its two eastern on the Caspian and Persian Seas, "and so takes all Russian lines of advance in flank.

"From this it is evident that the secure possession of the Euphrates "line is decisive as regards the ownership of all land lying within the "quadrilateral. It must therefore be the political and strategic task of "Russia to get the Euphrates line into her hands, and that of her "enemies to prevent her doing so at any cost.

"The great importance of a railway along this decisive line which "connects Antioch with the Persian Gulf follows as a matter of course. "It is the only means by which it would be possible to concentrate, at "any moment, on the Euphrates or in the northern portion of Meso- "potamia, a force sufficiently strong to operate on the flanks of the "Russian line of advance and stop any forward movement. * * *

"It is true that, at first, the aggressive policy of Russia in the East

" will only threaten the kingdoms of Turkey and Persia, but as neither " one nor the other, nor both combined, would be strong enough, with- " out assistance, to meet the danger successfully, England must do so ; " and it is certain that she must, sooner or later, become engaged in a " fierce contest for supremacy with Russia. * * * *

" The Euphrates Valley Railway becomes therefore a factor of in- " estimable importance in the problem of this great contest. Even now " the construction of the line will counteract the Asiatic policy of " Russia, for it will strengthen the influence of England in Central " Asia and weaken that of Russia. * * * *

" The growth of Russia in the East threatens, though indirectly, the " whole of Europe, as well as the States named above, for if she were " firmly established in Asia Minor the real apple of discord, Constanti- " nople, would be in imminent danger, all the commerce of the " Mediterranean would fall into her hands, and she would command " the canal through the Isthmus of Suez.

" Whatever the commercial value of the Suez Canal to Central " Europe, there is no doubt that it is secondary in importance to the " Euphrates Railway, which affords the only means of stemming " Russian advances in Central Asia, and which directly covers the " Suez Canal."

Yet the establishment of this route has been pressed for twenty years in vain on the attention of the Government of this country; and even the high recommendation of the Select Committee of the House of Commons has failed to awaken the Government to a sense of the gravity of the issues involved.

The subject, important as it is in its bearing on the power and stability of the whole British Empire, is one of absolutely vital moment to India; but it should not be forgotten that all our Eastern possessions would participate in the benefits which would accrue from the establishment of the Euphrates route. To take, for example, the case of the Australian colonies—the trade of Australia, which is even now in its infancy, employs between 500,000 and 600,000 tons of shipping annually, and the number of passengers that have left Great Britain for the Australian and New Zealand colonies during the last fifteen years has exceeded an average of 25,000 per annum. The acceleration of the journey which would ensue on the opening of the Euphrates route, could not fail to result in a great increase of the traffic, while new markets would at the same time be opened up to receive the fast increasing produce of these colonies.

There is ample reason to believe that the proposed undertaking would prove remunerative at no distant date; at the same time the results sought are far more important than those which are usually looked for in a pecuniary investment. Why should not we regard the Euphrates Railway as the French have regarded the Suez Canal? In the words of a recent writer, "Nations may receive much larger " returns for judicious outlay than any to be commonly looked for by " shareholders; for the results in material prosperity to be derived by " a community from augmented facility of communication, from moral " and political progress, and above all from an increased security for

" peace, far transcend in value any conceivable amount of dividends, " and should be taken into account in determining as to the propriety " of lending governmental assistance in particular instances."

The general features of the projected Euphrates Valley Railway may be thus briefly summed up:—

It would connect the Mediterranean with the head of the Persian Gulf, between which and Kurrachee and Bombay regular communication is now maintained by a line of powerful steamers, subsidised by the Indian Government.

Making Kurrachee the European port of India in place of Bombay, it would save about 1,000 miles in the distance between England and India, and would reduce the time occupied in the journey by several days.

It would render it possible to maintain India with a smaller European garrison than is now necessary, and would thus reduce our military expenditure.

It would save the Government large sums in sudden emergencies by the facilities it would afford—and that at all seasons of the year—for the transport of troops and stores.

It would enable troops from England to be landed at Kurrachee in about 14 days, and in 2 or 3 days more at Lahore, Peshawur or Delhi, when the Indus Valley Railway system is complete.

It would subject an enemy advancing towards the north-western frontier of India to easy attack in the flank and rear, and would render the invasion of India all but impossible.

It would render the resources of England so promptly available in the East that Chatham and Portsmouth might be made the bases of operations almost as easily as Kurrachee and Bombay; and any hostile movement directed against us, whether from within or without our Indian frontier, might thus be effectually checked before it could assume formidable proportions.

Similarly, it would give our extensive military establishments in India a direct influence in support of our power and prestige in Europe.

It would give England the first strategical position in the world.

It would relieve Persia from the predominating influence of Russia, by giving her access to a port on the Mediterranean.

The railway would be easily defensible by England; both of its termini being on the open sea.

It would be protected by two formidable rivers, the Euphrates and Tigris, on the flank most likely to be assailed.

The length of the railway, from Alexandretta, on the Mediterranean, to Grain, on the Persian Gulf, would be about 920 miles.

The country is admirably adapted for the construction of a railway, and the cost of the line is estimated by competent engineers at from £8,000 to £10,000 per mile.

The capital which would be required would thus be under 10 millions.

Of all the lessons which recent wars have taught us, none is more emphatic than this, that henceforth the power of nations must be upheld by the knowledge and use of mechanical appliances. Among the most important of these are railways, as we saw in the Franco-

German war. A vague presentiment of this marvellous revolution had long existed, but it had to struggle against apathy and deep-seated prejudice. The true secret of national supremacy has, however, now been brought home with irresistible force to the most reluctant mind; and we must brace ourselves anew for a more determined progress, if we would retain the prestige and influence we have hitherto enjoyed as a great nation.

In the Crimean war we saw, with certainty, where the power of the Czār first gave way. The telegraph and rail were the missing links in his armour. He had built fortresses of colossal magnitude, collected resources astonishing from their variety and abundance; his generals were selected with consummate skill, while over the persons and property of his subjects he exercised unlimited control. But all these were as nought to the Czar in his extremity; and the giant aggressor was, by a handful of invaders, with telegraph and steam in connection with the bases of their operations, defeated and humiliated on the soil of holy Russia herself.

We all know how alive Russia has since become to the necessity of following up her advances by improved means of communication. It is inconceivable that any power but England, having either means or credit at command, would hesitate how to act under such circumstances as those in which we are placed. To us it has been a continual reproach that we are never ready for the emergencies which we might readily have foreseen. Let us not refuse, therefore, to learn wisdom by the experience of the past, or some day we shall assuredly be called on to spend untold treasure to retrieve disasters which a little timely forethought would have enabled us to avert.

Captain TYLER: As a fitting supplement to the paper I will also read a letter written by Sir Arthur Cotton to Mr. Andrew on the subject of this proposed railway.

Extract from a Letter from Lieutenant-General Sir Arthur Cotton to Mr. Andrew, dated 20th May.

After expressing his regret at being unable to attend on this occasion, Sir Arthur Cotton goes on to say:—

"Having seen the country between the Mediterranean and the Gulf, I should like to give you my leading thoughts on it.

"I was perfectly astonished at the tone of the debate on it in the House of Commons lately. I could not have supposed it possible that such a debate could have occurred in our time. For instance, somebody spoke of the smallness of the traffic on the line of the Euphrates as an objection to it. First, what in the world has this to do with the matter? Was the Suez Canal decided upon for the traffic on its banks, or even on the shores of the Red Sea? We are proposing a work to connect the hundreds of millions of India and even of China with the hundreds of millions of Europe and America, and that question is to be decided by what takes place among the handful of people in the Valley of the Euphrates! But, secondly, what has the present traffic even on that line, where it is impossible any traffic worth mentioning can exist for want of communications and security, to do with that which those things will create? Are we now to learn that traffic is produced by communications? Was the passenger traffic between London and Greenwich, before there was a railway or a steamboat, the basis of calculation for the profits of those means of transport? For one passenger then, there are certainly 100 now, more likely 500.

"Is it not wonderful that that debate could have touched upon such points as "this, the present traffic between Bagdad and Aleppo?

"I consider this work as one of the very first national works in importance now "remaining. We have obtained a complete and effective communication for the "great mass of Indo-European traffic by bringing these countries within steaming "distance by the cheapest of all communications, ocean transit. The grand "thing is to establish the quickest possible transit for passengers and goods of high "value, and further, an alternative route, that in a matter of such incalculable im-"portance as the connection of the two parts of the British Empire, we may not be "absolutely dependent upon one line with all its complications of foreign soil, &c.

"If England paid down 20 millions for the railway from the Mediterranean to the "Gulf, it would be an insignificant sum compared with the immense interests involved "in it.

"With respect to the line itself, it is certainly the easiest line in the world. I "have travelled along hundreds of miles of it, literally as flat as a table, with firm "soil, no mud, no waterway; where the rails might be laid on the natural ground.

. . . .

"The first point I would urge is that the immense traffic between India and "Europe should not be made subservient to the local traffic. . . . .

"I hear that population is rapidly pouring into Palestine, and the vast city of "Beyrout, now, it is said, containing 100,000 inhabitants, is an indication of this.

"Thus the points I think to be kept in view are these:—

"That now the quickest route to India is the grand object.

"An alternative route with the Red Sea.

"That it is impossible to calculate what the passenger and valuable goods traffic "may become on such a route, connecting such enormous populations.

"That it is the easiest line in the world for a railway.

"That for England to grudge even a very large annual payment, if it were "necessary, in a work of such immeasurable national importance, should not be "thought of.

"That an amply paying traffic would most certainly be created by such a work in "a very short time.

"Most heartily wishing you success in this great undertaking,

"Believe me,

"Yours sincerely,

(Signed) "A. COTTON."

In a letter from Alexandretta, 24th April, 1873, from Mr. Franck, Her Majesty's Vice-Consul at Alexandretta, to Mr. Andrew, he states "that the sanitary condition "has been greatly improved, that the population is increasing rapidly, that houses "of a superior class are being built, besides numerous places of worship, that the "commerce of the port is rapidly increasing, and that improved means of communi-"cation with the interior are urgently required."

I may add that some years ago I was deputed by the British Government to examine the railways and ports of Italy with regard to the possible improvement of the means of communication with India, and in a report which I addressed to the Postmaster-General in 1866, I made these observations, which, being apposite to the present subject, I may perhaps be allowed to read to the meeting:—

"As I have intimated at the commencement of this report, the question to be "now solved is solely that of communication through Europe to the east of the "Mediterranean. But in saying so much concerning the postal routes to the East, I "would ask your Grace's permission to touch also upon the still more important "saving of time and distance that may be obtained hereafter by avoiding the passage "of the Red Sea, when a railway shall be constructed from the coast of the Medi-"terranean along the Euphrates Valley to the Persian Gulf. By this route many "hundred miles of distance and many days of time might be saved between London "and Bombay, which will become within the next two years (when the railways to "Madras and Calcutta are completed) the principal port of India. The navigation "by the Persian Gulf to Bombay will be far preferable to that *viâ* Suez and the Red "Sea to Bombay, and even that amount of navigation may ultimately be avoided by

"the connection together of Bagdad and Bombay by railway. In the meantime, "the Euphrates Valley scheme has been for many years almost in abeyance. The "mere guarantee of the Turkish Government has not been found sufficient even to "render the construction of the first portion from the coast to Aleppo practicable, "and the financial state of that empire renders progress now all but impossible. "But I have so strong a conviction of the important bearing that the construction "of such a railway would have, commercially and strategically, upon the British "Empire, that I could not but take this opportunity of recommending the subject "to the serious consideration of Her Majesty's Government."

I have also, and more particularly for the Parliamentary Committee of last year and the year before, upon this subject, very carefully computed the distance and the time that might be saved by adopting the Euphrates Valley line. I found, comparing the Suez route with the Euphrates Valley route, that the saving in time would be 92 hours by the Euphrates Valley route over the route by Suez to Bombay, and 130 hours as between the Euphrates Valley route to Kurrachee and the Suez route to Kurrachee. The saving in distance as between the two routes would be 723 miles to Bombay and 1,170 miles to Kurrachee. The cost of the Euphrates Valley line has been fairly estimated, I think, at about £9,000,000 of money, and the length of railway to be constructed from Alexandretta to the Persian Gulf would be about 900 miles. It may seem, and does seem to some persons a great deal of money to spend—£9,000,000 of money—in order to save the time and distance that I have stated. But that feeling will be found to diminish when this case is compared with other cases. For instance, let us consider what is being done, and has been done in America. Look at the railway across that continent from the Atlantic to the Pacific—1,700 miles long, from Omaha to San Francisco—over a great proportion of desert country more or less impassable in winter from the snow, and a great part of which will never be populated. Yet the Americans did not think so very much of making such a line, 1,700 miles long, with San Francisco at the one end of it and the settled States of the Union at the other end. Then there is the Intercolonial Railway in Canada. The Canadians have made a line at their own expense 400 miles long, for the purpose of connecting the Lower Provinces, New Brunswick and Nova Scotia, with the rest of the Dominion of Canada. And not only have they made these 400 miles over what is for the most part an unpopulated country, but they are also contemplating a line of 1,000 miles from Lake Nipissing to Fort Garry, over the sterile country to and round the north of Lake Superior; but further than that, they have also undertaken, as a part of the arrangement under which British Columbia joined the Canadian Dominion, to construct 1,600 miles of railway from Fort Garry to the Pacific. In looking at the magnitude of these operations, the comparatively small results to be obtained, and the difficulties connected with the working of such lines, it does not seem so very much to contemplate the making of a railway for a distance of 900 miles from the Mediterranean down the Euphrates Valley at a cost of £9,000,000. In that case we should look for a traffic not merely of pilgrims and coffins, which, according to one of our leading statesmen, in the recent debate in the House of Commons, was all that could be expected; we should not even care seriously for the local traffic which would ultimately be developed; but we should make provision for the through traffic between India, with 200,000,000 of inhabitants, and its rich productions, on the east, and the whole of Europe on the west. Then, again, the Russian Government has been wisely collecting British money from time to time for making long lines of railways through its vast territories, and is very fast completing and projecting lines of railway which will complete the communication of St. Petersburgh and Moscow with the country of the Caucasus, with the Caspian, and with the frontiers of Persia. And we all know that the Shah of Persia is about to visit this country with those who have undertaken to provide him with money for railways down to the Persian Gulf. Inasmuch as British money is materially assisting in the construction of railways which may hereafter become useful for hostile operations against the British Empire, it seems, again, not very unreasonable to advocate the construction of a railway of counteracting influence between the Mediterranean and the Persian Gulf which would be of supreme importance to us, as has been ably explained in Mr. Andrew's paper, commercially, politically, and strategically.

Captain FELIX JONES, F.R.G.S.: My Lord, ladies, and gentlemen: I rise with some diffidence to take part in this discussion. Although I have been long resident in the countries under notice, and in Mesopotamia in particular, still I should not have come here to-day, were it not that I read the debate on this subject in the British Parliament, which, I must say, surprised me exceedingly. We there learnt that this country, from time immemorial never had a population, and never would have one; I also read the remarks that Captain Tyler had alluded to—that "pilgrims and coffins" are its only trade, and that a first-class railway carriage per annum would no doubt convey the whole of the first-class passengers on the projected Euphrates Valley line. It was also stated that one goods train yearly would suffice for the goods traffic. Now, having been in these countries for so many years, having traversed them in almost every direction, and being well acquainted with their local features and rivers, I repeat that I never was more surprised in my life at hearing such remarks made in the British Parliament. I could not have believed it if I had been previously told, that people eminent for their learning, would speak in a manner discreditable to a schoolboy. With reference to the populations that have been there, and that may be there *in futuro*, almost every mile of the country indicates the falsity of the descriptions that were given of the country in Parliament by the opponents of this measure on the night in question. The whole face of the country, from Constantinople to the Persian Gulf, and that particular portion from Alexandretta to Grain—in fact all Mesopotamia—is covered with remnants and vestiges of habitations of a former period. It is covered in every direction with lines of canals, just in the same way that a chess-board is covered with squares. A traveller can scarcely go a mile without finding the vestiges of an early civilization, and we have only to visit our own museums to witness the works of a people long established on the soil. Knowing all this, to be told in the British Parliament that the country has never had a settled population is something wonderful indeed. With respect to the trade in "pilgrims and coffins;" perhaps no better commodities for commercial intercourse could have place in that part of the world, for every pilgrim that goes in the direction of the sacred shrines of Najaf and Kerbela, carries from every part of the Mahommedan world, his dead relatives simply to bury them in these sacred localities, and, at the same time, to make a long trading voyage. Braving the perils of the land and the sea for the purpose, and carrying merchandise, he profits, not only devotionally, but commercially. If anything in particular could give commercial value to the route in question, it is the fact, that almost every Mahommedan of the Shiah persuasion in India and Persia, and in countries still more eastward, has his eyes in the direction of these two shrines. Many of them proceed on foot; like the pilgrims, with peas in their shoes; they will bear any risks, endure any hardships in order to get to these localities. If we only provide the means for them, we shall never have to complain of a want of traffic in that direction, for "pilgrims and coffins" will bring profits in abundance. We know what has been the result of the trading voyages to the Persian Gulf of the British India Steam Navigation Company within the last ten years. In 1830 the whole of the British trade came round the Cape of Good Hope to India and from India, it was disseminated with Indian produce by way of the Gulf and Euphrates, throughout all Persia, and up to the very confines of Russia by means of the old East Indiamen. In 1833, the Charter of the East India Company was taken away, and from that time, the fleets of the East India Company ceased to visit that particular locality, and the great caravan routes were closed between the Mediterranean and the Persian Gulf. The consequence was, that in a few months the whole trade that spread itself northwards to the shores of the Caspian and the Black Sea, was put a stop to, and from that time, until 1862, Russian trade began to flow from north to south, and to occupy the position formerly possessed by the British trade. In 1862 the Government of Bombay were induced to take up the question through the enterprise of British merchants, and by way of testing the route again, they granted to the British India Steam Navigation Company a subsidy of a small amount. A small steam-vessel about 600 or 700 tons was first sent from India to the Persian Gulf. Such was the small amount of produce to be got there after that long lapse of time, that this small vessel could scarcely find enough to make half a cargo for the return voyage. The same thing occurred for two or three voyages, and then there was evidently an increase, owing to the merchants keeping

to regular dates. That was in 1862. In 1872, instead of that small ship of 600 tons, returning every six weeks half filled with impressed goods to India, it was contemplated to run vessels weekly. Vessels of upwards of a thousand tons now go and return constantly full, both of cargo and passengers. That, assuredly, is an indication of the great increase of traffic there, and most of that traffic is due to the "pilgrim and coffin" class. With regard to the passengers who would travel between the Persian Gulf and the Mediterranean in such small numbers, that "one first-class carriage would suffice to take them, and one goods train per annum," I should like to have been a Member of the British Parliament for that night, and to have asked the gentleman making that remark whether he had ever been in Egypt before the creation of the Red Sea route. It happened to be my lot to be in Egypt at that time, and I remember that one donkey would have sufficed to carry the whole traffic of the region; but the fact of one donkey or one first-class carriage sufficing for the whole traffic of the region at this or that day, surely is no indication of what good railway communication will effect? I may draw attention to the locality under notice. Mr. Andrew's paper has very ably described the whole of the tract. In fact, anybody who wishes for information in detail on his particular line may get it pretty well from the evidence given before the Select Committee of the House of Commons, whose favourable report by-the-bye seems to be of no account whatever with the Members! With respect to other railways than that under notice, I would draw attention to the whole of the region from Constantinople, or Scutari, north of Aleppo towards Mosul, and onwards to Ispahan and Herat. That tract is covered by ranges of the most stupendous mountains with no great distances between them, so that they are constantly overlapping the one over the other. To carry railways through that region of Asia Minor to any part of our Indian territories eastward would be perfectly impracticable even if we had more money than we are said to have at our command. I do not say that there are positively insurmountable engineering difficulties there; but there are such engineering difficulties as to be almost insurmountable from the want of money. No amount of capital would suffice to construct and maintain a railway through that country. Then there are the enormous political complications which it would give rise to. The Russian frontier touches on Ararat. You have Turkey immediately on the one hand, local tribes to the eastward, and Persia on the south with all its tribes, and with the other tribes to the east of Persia again. Then, through Herat and Afghanistan to India you would require separate Treaties, and of course where separate Treaties are concerned, there are complications which increase every mile. Any attempts to carry a railway in that direction must be wholly futile—at least in our day. A millenium must take place before such a thing could be perfected so as to carry out speedy intercourse with India; but south of Aleppo, eastward to Mosul, there are no difficulties but what might be surmounted with money and ordinary circumspection. Some people are for taking the railroad from Aleppo eastward by the foot of the mountains trending towards Mosul, and across the Tigris by the eastern banks to Bagdad, and so on east of the Tigris to Bushire and onwards to India by the margin of the Persian Gulf. That, no doubt, is a very feasible plan; it merely requires money; and indeed a portion of the line is, generally speaking, on the track of the ordinary traffic of the day. I would explain that the reason of the ordinary traffic being at the present day in that direction arises simply from the fact that Turkey has become too weak to carry its trade, where, from the very remotest ages, it had its lines of direction from the Mediterranean to the Persian Gulf: it is unable to defend the line of the Euphrates; the consequence has been, that the current of trade has set on the north-eastern parts of the Empire where the rivers are placed between the travellers, the traders, and the Arabs. But by taking the route from Alexandretta by way of Mosul we increase the distance very nearly 300 miles. Now 300 miles of extra distance is a very expensive concern. Again, when we get to the east of the Tigris, if our object is to go to Grain, we have to come back across these rivers after going to Bagdad in a region wholly flooded during most parts of the year, or so far cut up with water that it would endanger our railway communications wherever they might be. Again, in taking the railways from Aleppo to Mosul, the whole tract lies at the foot of a very high range of mountains, rising almost immediately from the Mesopotamian

plains. The consequence is, nearly every mile of the country in that direction is traversed by ravines that have been cut in a southerly direction by the rains and the melting of the snows for ages. The result would be a longer railroad, and every one of these ravines would have to be bridged, and viaducts of an enormous extent would have to be made. Taking the railway in that direction, even to Bagdad, would be so very expensive as almost to neutralize its utility. Then, having got as far as Bagdad, we enter at once upon the marshy tracts—tracts broken up by the inundations issuing from the very high mountain ranges of Persia on the eastward, and from the Euphrates and Tigris themselves having broken their embankments farther north, and overspreading the whole country from Hillah, due east. South of this line must be understood to be the true basin of the Euphrates and the Tigris rivers. There, at the period of the melting of the snows on the Armenian and Persian mountains, the waters spread occasionally as far as the Persian mountains; to carry a railway across Mesopotamia and through these marshes would, therefore, entail not only an unnecessary expense but would necessitate constant repairs at an expense too enormous for any engineers to think of. Within a few inches of the surface of the soil, water is always to be obtained; and, I believe, all engineers will agree that a place where water can be got so readily is not a place for viaducts; for their foundations must lie at a depth of 16 or 18 feet to be secure in this part. I, therefore, look upon the route of the Tigris—especially on the western bank—as not to be thought of.

The question of intercourse with India resolves itself simply into a financial question. I maintain that the direct route is the best, and financially the safest to enter upon. That route is undoubtedly from Iskanderoon by the Euphrates to Grain on the Persian Gulf. Here the earliest capitals stood. It is the old route of trade from the remotest period. The traffic between India and all the Western World, has from ancient times, followed this line of direction. The Mahommedans, when they first overran the country from Arabia, settled in these districts; and it was only when they extended their conquests farther eastward into Persia, that they made Bagdad the capital, and for more reasons than one. As the Caliphs became weak, they liked the Euphrates between themselves, and their kindred Arabs; for Arabs are no respecters of persons: they will eat each other up just as readily as they will prey upon the general community. Here, then, they could be utilized. Therefore, I look upon the city of Bagdad as it at present stands, as more a city created by weakness than by strength; and if it were our purpose even to aid the Turkish Government in railway intercourse through its dominions in this direction, I maintain that the two holy shrines of Najaf and Kerbela, which you see on the route, and the other towns that are in existence there, would become of great local importance, and would strengthen her dominions throughout, besides giving us an alternative way to the East, and a very fair return for our money. I do not mean to say immediately, but in a few years. Then, again, if we wish to make Mesopotamia a country, as it is stated to have been of old—the granary of the world—we must give peace to Mesopotamia; and Mesopotamia never can have peace unless we draw the line of railway in the direction that Mr. Andrew has pointed out. By that means we should have a barrier against the Arabs, and peace within the fertile region of the rivers, so as to admit of colonists pursuing their operations in quietude. I find that I have exceeded my time, but really the subject is so large, that one does not know where to stop. Let me add that the perfection of Great Britain's duties to British India lies now in the direction pointed out.

Lieutenant-General Sir ARTHUR T. CUNYNGHAME: Having been requested to say a few words upon an overland route to India, the only claim which I can show to a knowledge of this subject is that of having commanded the division of the Army of Bombay in Kurrachee under his Lordship our President, and of having travelled latterly through a large and interesting portion of the northern countries shown on the map.

I allude especially to the Sea of Azof, the rivers Don and Volga, the Caspian Sea, and, generally, by Tiflis, Mount Ararat, and the confines of Persia and of Turkey.

The question, I conceive, now before us is, what is the most advantageous route

for a direct railway line from England to India, and one that would be a really overland one.

Now if we look at the map we should say that the nearest route would be by Constantinople and Scutari, then passing to the north of Ararat by Erivan, thence near Teheran towards Herat, from thence *viâ* Candahar to Mooltan, thus entering India directly from the west.

The alternative route to be considered is that from Constantinople to Aleppo, thence to Bagdad and Grain, thence by the south of Persia, Shiraz, Bunder Abbas, and Beloochistan to Kurrachee.

Now let us briefly consider the advantages and disadvantages of these two systems.

First, let us look at the northern one. I think it must be conceded that this is the most direct. But the disadvantages are manifest. Before any portion of this route could be available, nearly the entire distance must be compl ted, and its length would be open to possible trouble and future complications. When I was in the Government of the Caucasus, between the Caspian and the Black Seas, I then learned that it was the intention of the Russians almost immediately to connect the northern lines from Taganrog by Stravapol and Deobend with Bakou her new naval arsenal on the Caspian, and then to prolong this line towards Persia, and so to Teheran. Now when we look upon the enormous forces which Russia has at her command, and the facilities for transporting them—at least 150,000 men in the Caucasus alone, in addition to troops in the interior, on the Don and the Volga—it will at once be seen how rash it would be for us to expose our long thin line of communication to such chances, putting even out of the question such difficulties as we should meet with in consequence of its running through nationalities very slightly civilized and under different rulers; indeed, when I was near Bakou, it was reported that Astrabad was surrounded by wild hordes of Kurds, so that the Persians were not able to enter their own city.

Taking, therefore, all these circumstances into consideration, as well as the distance and the expense, I cannot hold the idea that our overland communication with India should be made—more especially with English gold—by the line of the north of Persia.

Being of this opinion I desire to examine the next proposition.

Now presupposing that we arrive at Constantinople by rail, which we very soon shall do, let us consider a line from thence to Aleppo, and Bagdad, and Grain, then branching from Bagdad to Shiraz and Bunder Abbas, and then by Beloochistan to Kurrachee. When completed this line would equally take us into India without a mile of sea.

One of the greatest advantages of this line would be that a large portion of it would be available for traffic before the whole was completed. I allude to Aleppo, to Bagdad, and Grain, the connecting link from Aleppo to the Gulf of Scandaroon being made.

This centre portion, it is stated upon excellent authority, is about 900 miles long, and would cost about nine millions to complete. The remaining portions, to obliterate all sea traffic, would probably cost the same sum of money, and would not very much exceed the same distance; and the connecting link from Aleppo to Alexandretta would render this line immediately available for traffic, and would open out communication with Spain, France, and, Italy, and by the Straits of Gibraltar with America.

For the reasons, therefore, I have above adduced, and believing that it is far more advisable if possible to penetrate the lands of one foreign State rather than many, and that of one who has ever proved to be a sincere friend of our own, I believe that this is the best line we could adopt for our overland line to India—one which could be more readily protected by us—and looking into our general political relations and our great interest in India, I am of opinion that no time should be lost before we should mutually draw together—the 150 millions of inhabitants which inhabit our Eastern Empire with ourselves—and that a first outlay of nine millions of money is by no means excessive towards obtaining so desirable an object.

Colonel Sir ARNOLD KEMBALL: My Lord, I believe the discussion on this subject would not be complete without some advocacy of the line which has been condemned

by Captain Jones—that, namely, from Aleppo *viâ* Mosul, and so down through Bagdad to Grain—Grain would still be the terminus of this line, which, I think, there can be no doubt, commercially, would be superior to that proposed by the direct route from Aleppo down the right bank of the Euphrates. Whatever may have been the state of the country in very ancient times, it is the fact now that the line in question would border an absolute and irreclaimable desert which it would be impossible to cultivate; also, that at the present time, over a great portion of its course, you would have to create a population, and consequently, a trade. As you get lower down you meet with more settled inhabitants, but they are excessively poor, and the products of the country are inconsiderable. It yields nothing that could support an internal traffic to the railway, and even the rice grown there is scarcely sufficient for the demands of the population of the province. It affords nothing for export until you get to Bassorah, whence dates are available. Therefore, that line for at least a very considerable period must depend for its income upon the through traffic between Europe and India. Again, referring to the greater facilities afforded, whether for the transport of troops or for commerce, by the Suez Canal, or even by the short railway through Egypt, no merchant would undertake the risks and delays of transit consequent upon having to land his goods, in the first place, at Alexandretta, and to re-ship them at Grain, with a thousand miles of rail to be traversed in the interval, while by the Suez Canal he could convey his cargo, without breaking bulk, from Europe to India. As regards the saving in time, though no doubt a considerable saving would be effected in actual distance in favour of the Persian Gulf route, viz., 700 miles to Kurrachee, and 1,100 miles to Bombay; on the other hand, we must not overlook the amount of time that would be lost, to say nothing of the risk incurred, more especially in the transport of troops over 1,000 miles of country. Surely to convey them in carriages from the terminus on the Mediterranean to the terminus at Grain, with all their stores and equipments, would involve a certain loss of time, fully counterbalancing the gain in distance. The fact is, I think, that neither of the two lines referred to, that is to say, the line by the Euphrates Valley and the line by what we should now call the Tigris Valley, can ever come into competition with the route *viâ* Egypt. These must be considered in contrast with each other, on their own merits exclusively. It is perfectly true that, in point of distance, the difference in favour of the former would be, say, 250 miles, and in respect to the latter, also, the cost of maintenance would be considerably enhanced,* but the longer route has this advantage—that it would run through the populous districts of the country where a traffic actually exists. As Captain Jones observes, a traffic has been developed by the line of steamers established between Bombay and Bassorah, but every portion of that traffic is derived from the Tigris,—not a particle of it, I believe, from the Euphrates. The reasons are obvious. Not only has the line of the Tigris the advantage of a considerable local traffic, but over it must pass, as far north as the latitude of Diarbekir, all the trade of the western provinces of Persia, on its way to either sea. The Euphrates line, on the other hand, would border an irreclaimable desert, without a single feeder of any kind. Moreover, during construction, we might calculate upon each section of the Tigris line, when completed, contributing to pay its own expenses. Holding these views, I have thought it only right to contrast the merits of the two lines. Very eminent men have been mentioned as supporting the one, but the other also has its advocates, and among them I may mention one of acknowledged eminence, namely, Sir Henry Rawlinson, who has had no hesitation in giving the preference to the Tigris route.

Captain the Hon. RANDOLPH STEWART: My Lord, Ladies, and Gentlemen, the reason why I address you is that, although I have not had the advantage of living in these particular countries, I have been many years in India and other parts of the East, and have spent a good deal of time, and considerably too much money, at Constantinople, about this very question. I think that the discussion, this afternoon, has wandered away from the main point. We

---

* The adoption of the Tigris Valley route would necessitate the construction of two bridges over the Euphrates; but to connect the Euphrates Valley line, if adopted, with Bagdad or Mosul, it would equally be necessary to bridge that river.

met here to discuss the Euphrates Valley Railway, with reference to the Central Asian question. I do not think that, in the paper we have heard read on behalf of Mr. Andrew, and, with very few exceptions, in the words of the subsequent speakers, that any practical reference has been made to the Central Asian question whatever. I maintain that this Euphrates Valley Railway project has less to do with the Central Asian question than any other scheme of railway you can devise in that direction. We have heard a good deal about "lofty ambition in talking about "railways from Constantinople and through-railways by Persia towards India." Now, I admit I am one of those who hold that lofty ambition, and I am in good company, for Sir Donald Stephenson, who was the pioneer of railroads in the East, has all his life advocated a railway starting from Constantinople, and passing *vid* Persia in that direction, and he still holds the same views. Then we come to the question of the Euphrates Valley proposal itself, and we have been told that this railway is necessary, and that it must be carried out. I maintain that the Euphrates Valley Railway Company, as it has been called, has been the bugbear to all improved communication with the East. Some 16 or 20 years ago there was a company—their concession has long ago lapsed, and that company does not now exist—but those who promoted it still keep its name up and its memory alive in a window in the City, and, whenever an attempt has been made to carry out through-transit with India, the original promoters of this line have stood in the way, and have prevented what might have been realized from ever coming to a head. One reason that I may mention against the Euphrates Railway scheme is this, that, when I was at Constantinople, I was intimate with the Ministers of that day, with Aali Pacha and Fuad Pacha, both of whom declared to me most solemnly, that they would give no concession whatever for any railway through Asia Minor that did not take its start from Scutari. Now, the Turks have a right to be heard in this matter. Of course they may have changed their opinion since that time, but we have nothing before us to show that they have. They were offered very good terms indeed by the parties with whom I co-operated, and I doubt whether they would give a concession now, with guarantee or subsidy, unless the line started from Scutari. At that time there was an idea of connecting the projected Asia Minor Railway, of which I was one of the concessionaires, with the European lines which were being made, and for which concessions also had been given, down from Belgrade southward; and a distinguished German engineer, Herr Ruppert, drew out plans, by which he showed it was possible to bridge even the Bosphorus. Now, if this were carried out, and the railway was brought down from Ismid to Kutaya, Konia, and Kaisaria, we get to the Taurus range. Of course it is very difficult to cross the great chain of the Taurus, but I do not think, in this age of the triumphs of engineering, we need imagine there is any mountain range which an engineer cannot either pass over or cut through. Where the Taurus range finishes towards the north-east, the spurs of the mountains become much lower, and, if a line were to go from Kaisaria some distance north-easterly from Aleppo, south of Ararat, and down the Tigris by Mosul—the ancient Nineveh—to Bagdad, it would not only travel through a most fertile part of the country, but it would have this advantage to its shareholders—that the Turks themselves are extremely anxious to be put into communication with Bagdad. Bagdad is the richest of their provinces and, when they send a Pacha there to administer their revenues, they get precious little in return from him. He makes himself rich, but the State gets no good from it. They are therefore extremely anxious to be put into rapid and easy communication with Bagdad, and would probably be most willing to further a line by this route. It was said in the paper read, that the two termini of the Euphrates Valley Railway, being upon the open sea, might be protected by our fleet; but, unless Sir William Palliser can invent us a gun carrying 900 miles, I do not see how that is to prevent incursions of Arabs in the centre of the line. It runs through a perfectly barren country part of the way, and they are in terror, even now, of the Arabs, in those parts. How then are your working parties to work without protection from these marauders? The Turks are not able to give it, and the moment we land a European soldier, for either offensive or defensive purposes, in that country, we open up an international question, which, I doubt whether Russia would allow us to decide in the way we should wish. Further, I think I am right in stating that troops never travel more than 200 miles

a day by railway; and, as this is a distance of 900 miles, they cannot go that distance all at once, but will have to halt more than once on the journey (see foot note). With reference to merchandize, I am convinced that merchants would not be willing to break bulk at Alexandretta and the mouth of the Persian Gulf as well, for the sake of a saving of a few hours' time; and I am also of opinion that the advantage gained by not having to disembark troops, to re-embark them, and to halt them from time to time on the road, will greatly counterbalance the very short extra time taken up by going through the Suez Canal. There is one other point I must allude to, which was the statement that steamers could attack the flanks of troops moving through Persia, along the head of the Persian Gulf. It is almost too absurd to be adverted to, but it was one of the arguments made use of, that, if we had this line of communication to Kurrachee, steamers could protect or annoy troops advancing round the head of the Persian Gulf. We know perfectly well they have just to move a little way inland, and all the steamers in the world could not have any influence upon them. I think, before I sit down, I ought to sum up what I feel on this subject, in these words: that, until we can satisfactorily state what is really not only the most economical—I do not mean the cheapest, for that is not always the most economical—but what will ultimately prove the most economical, and the most strategic line, and at the same time the line with the greatest probability of permanence and commercial success, it would not be advisable for our Government to support this scheme. I had some conversation, five years ago, with the then Secretary of State for Foreign Affairs, the present Lord Derby, about an enterprise, of which this scheme was part of the subject, and he told me it was impossible that the then Government could submit such a project for parliamentary support, and I ask you whether, considering the composition of the present Parliament, it is more likely to help the plan than the last?

Captain WILSON, R.E.: I should like to say a few words on the great military importance of this railway. We may look at it from three points of view: First, as an alternative route to India. I do not think we can have too many strings to our bow, and the Euphrates Valley Railway would give us an additional line of communication with India. We have, at present, two lines—that by the Suez Canal and that by the railway through Egypt. Either or both of these might be closed to us, by local complications or by a combination between Egypt and one of the Great Powers, with a view of obtaining her independence. It does not seem generally known that the canal can be closed with great ease, either by sinking a ship in the channel, or by blowing in the sides at two or three points where the banks offer peculiar facilities for hasty demolition. It has been said that we could keep the canal and railway open by having a ship at each end of the canal, but if there were local complications in Egypt, I do not see how two ships, one at either end of the canal, could keep it open; it would not prevent a ship being sunk in the channel, nor would it prevent the sides being blown in; and unless we are prepared for a military occupation of Egypt, we should have to depend on the old route round the Cape. The Euphrates Valley Railway would, of course, be also liable to interruption from local disturbances, but I think the tendency of the evidence given before the Commission is to the effect that little interference is to be expected from the

---

NOTE.—My remarks about the movements of troops at a rate of not more than 200 miles a day were, of course, intended to refer only to the ordinary reliefs, and that I am probably better aware than Sir G. Jenkinson, from having had much personal experience, that, in times of emergency, troops can make forced marches by rail as well as by road; but I also omitted to point out that the rolling stock on the projected Euphrates Valley line could never be sufficient to meet the sudden requirements which warfare in India would demand. It is necessary to point out that the best modern military authorities require 72 trains, of from 24 to 30 carriages each, to transport 20,000 infantry, 2,000 cavalry, 8 batteries with the necessary ambulance, ammunition, &c.—a smaller force than that despatched to India in the mutiny, and that intervals must be allowed between the despatch of each train. I ask any impartial reader what would become of this force on the Euphrates Valley Railway, if it were made, and how long it would take to get to Kurrachee?—R. S.

Arab tribes along the course of the proposed railway. I do not know any one who could give better information on this subject than Captain Felix Jones, and I believe his opinion is, that there would be little or no trouble in making and protecting the railway. Second. The shortest route to India. It is most desirable to obtain the quickest possible means of communicating with India, and if we can only save three days, it would be, under many circumstances, of great importance. For instance, supposing the Indus Railway system completed, and a Russian attack to be made upon India by the route of Herat, Kandahar, and the Bolan Pass, it would be of the greatest importance to save three days in the conveyance of troops from England to Kurrachee, whence they could be thrown upon the line of the Indus to meet any force advancing from Afghanistan. Third. The strategical importance of the railway with reference to Russian movements in Central Asia. Baron Kühn, the Austrian War Minister, in the pamphlet he published in 1858, was one of the first to point out that one of the probable effects of the Crimean War would be to direct Russian attention to the East, and that, having been foiled in Europe, she would endeavour to compensate for it by increased activity in Central Asia. We have seen what rapid progress she has made during the last few years; and Baron Kühn thinks that the movement is, in reality, one directed towards the Persian Gulf. His opinion, in one respect, was recently endorsed by Mr. Disraeli in the House of Commons, namely, that the acquisition of a seaport which can be used at all periods of the year, is a necessity to Russia. At present she has only one seaport, Vladivostok, on the Sea of Japan, which is not closed by ice for several months during the year. In the event of a Russian advance on the Persian Gulf, a railway up the Valley of the Euphrates, would, as the extract from Baron Kühn's pamphlet shows, be of the greatest importance, and I think that the position which has been laid down by Mr. Andrew, and of which Captain Felix Jones approves, is certainly the best, in a military point of view, that could be adopted. Any force advancing on Mesopotamia from the Russian possessions would have to cross the mountains that Captain Felix Jones has just described by extremely difficult passes, and would afterwards have to cross the Tigris and Euphrates before they could reach the railway and interfere with the communications. The time which a Russian force would take to reach the Euphrates from the nearest point of the present Russian boundary, would be from five to seven days more than we should require to convey troops from Bombay or Kurrachee to any point on the railway, so that we should always be able to concentrate a force in the Euphrates Valley in ample time and sufficiently strong to deal with any force advancing from the north. As far as regards the most suitable route for the railway to follow, I think we should endeavour to secure that which would be of the greatest strategical importance, and would afford the greatest facilities for the transport of troops, not that which would be most convenient for the carriage of merchandise and passengers. It is difficult to see how we could transport troops from Scutari to India; for in order to get them to Scutari, we should have to make treaties with every country in Europe through which the line of railway passed; and the difficulties to be expected in Asia Minor have already been mentioned. A failure on the part of any one country to fulfil the stipulations of any such treaty would close the line; whereas, if the line shown on the map be adopted, we should always be able to secure the ports as long as we retained the command of the sea, which I hope we shall never lose. Similar objections of course apply to any railway commencing from the shores of the Black Sea, with the additional one, that it would be of more assistance to Russia than to England.

Sir GEORGE JENKINSON, Bart., M.P.: I had no idea of saying anything when I came here to-day, but as his Lordship has asked me to say a few words, I think there are, perhaps, one or two errors which have been stated to-day, which, from my knowledge of the subject, I may be able to correct. In the first place, I must say I entirely concur with the able paper which has been read to us. It contains the very marrow and pith of the whole of the evidence and information which has been brought forward many years ago, and also before the late Select Committee of the House of Commons, and it embodies everything that has ever been said by the pioneers of that line, beginning with the lamented General Chesney, and the most eminent men who have studied the subject. With regard to the upper line through Persia, I heard Sir Henry Rawlinson give his evidence, in which he described that

and other similar routes as simply impracticable, because of insuperable engineering difficulties, and therefore I do not think we need waste any more time in talking of them. His only objection to the line along the Valley of the Euphrates was, that it would cost too much money, and more money than he thought it would be worth the while of England to lay down. That is an opinion in which I, for one, do not at all concur, because I think, for a great country like England—the pioneer of civilization, the nucleus of wealth, and the leader in the van of progress all over the world—to raise such a paltry objection to such a line as the Euphrates line would be, giving us such advantages, morally, and physically, and politically, for our great dominions in the East, I think it is an objection which ought not to weigh for one moment. Assuming the outlay to be ten millions—I believe the line might be made a single line for five millions—assuming, however, the cost to be ten millions, and assuming England to give a mutual guarantee with Turkey for the interest on that sum at four per cent.,-Turkey has always fulfilled all her engagements; she never failed to fulfil all her pecuniary promises to this country; at this moment, the loan, which was guaranteed by France and England in 1854, is now at the same price as it was when it first started, I believe at about 102. I mention that to show that I do not believe England would incur any pecuniary risk whatever; the interest upon the amount of money would be paid by Turkey, and the advantages which we should gain by the transmission of our men and troops when any emergency arose, would entirely counterbalance any possible pecuniary risk we might undertake. As to the remark made by Captain Stewart, that English troops could not go 900 miles in railway carriages if the safety of India was at stake, why what becomes of the whole history of England? what becomes of all that English troops have ever done —marching great distances in the hottest of suns, and dying, perhaps, by scores? To say that English troops could not go 900 miles if they were required to do so on any emergency, I do not think that is an argument which any Englishman need ever waste time to answer. When we recollect the passage in the Red Sea, which is now fraught with the greatest danger and suffering, I think the troops would be gainers by the transition. But supposing that no troops were taken by that line except in a case of the greatest emergency—and I will on that point allude to the evidence which our noble President and others gave before that Committee, which I do not think Captain Stewart can have read, for he seems to be entirely ignorant of all the great facts brought out with such force upon that Committee—the whole of the evidence went to show that in cool weather the troops would be infinitely gainers by being taken by the Persian Gulf route. And as for the argument, that the line might possibly be attacked by Arabs, what would be easier than to make the various stations small forts. In the first place, the line from Alexandretta to Aleppo would be perfectly free from attack, and taking the whole of the plain, nothing would be easier than to make the various stations small forts. Everybody knows that the Arabs are always amenable to reason, and to be treated with, and that they always faithfully perform their engagements; and even if they do not, why in America they have used the same precaution of making forts along the railways, therefore I think that is an argument not worth treating seriously. But as long as the English Government refuses to assist in a pecuniary manner this line of railway, I am afraid private enterprise will never be able to undertake it. With regard to the wishes of the Turks, I quite admit that their wishes ought to be consulted; but from my own personal knowledge, if we are to attach any importance to the authority of the present Turkish Ambassador in this country, his Excellency Musurus Pacha, he was the first person who put this matter into my head; he always has been a most earnest advocate of the Euphrates line there pointed out, from Alexandretta to Grain; he has always written to me, and told me that the Turkish Government are most anxious for that particular line; that although they would also be glad to get the line from Constantinople to Aleppo, he knows that is entirely a Turkish affair, and if the Turks wish for English assistance, they must construct the line that will best suit England. He has always strenuously advocated that line, and no other; therefore I think there is no difficulty on that score. I had no idea of taking part in this discussion, but if people, taking any interest in these questions, would only read the evidence taken before the House of Commons upon different points, they would see that a great deal of what has been said to-day

is utterly baseless, and that the real point at issue is one of money, and of money only.

Captain TYLER: In thanking the meeting for the kind manner in which they have received this paper, I would add a few words in reply to some of the speakers. With regard to the Suez Canal it is no doubt a most valuable auxiliary to the traffic between Europe and the East, and it is especially useful to us; but, as Captain Wilson has said, the navigation might at any moment be interrupted, or altogether stopped, only too easily, either by means of a little gunpowder for blowing in the sides of the canal, or by sinking a ship or two in it; and in the event of a military emergency, it might thus be quickly rendered useless, and could only be made available again after a considerable lapse of time. It would, indeed, take a much longer time to render it again fit for service than a damaged railway. Then, again, as regards the competition of the canal for traffic, no doubt the canal is, and always will be, as long as it remains efficient, most useful for the transport of goods which it would not pay so well to carry by railway; but in the case of many classes of goods a saving of time is very important; and the railway would be valuable for those descriptions of traffic which it would be worth while to send along it, such as silk, indigo, tea, &c., besides the mails, passengers, and various valuable commodities. As regards the differences between the two routes, the one by the Tigris, and the other by the Euphrates; no doubt, as has been well pointed out by some of the speakers, the longer route—of say, 1,150 miles—by the Tigris, would be in the opinion of those who might wish to make the railway for the sake of obtaining local traffic, or of developing the country, the more important route of the two; but *our* main object in advocating the construction of this railway is to acquire the shortest, quickest, and most efficient means of transport, for military and other purposes, that we can possibly get, with a view to expediting and improving our own communication with the East. Looking at the subject from that point of view, it is not to our interest to guarantee such an amount of money as shall enable the Turks to develop the resources of their country, but only to guarantee such sums of money as are necessary for improving our own communications. And there can be no doubt, I would submit, that the line south of the Euphrates would be more easily defended, and would be attacked with greater difficulty, than any line which would run along the north of it, and, therefore, nearer to the military posts or depôts, now existing or hereafter to be established, of the Russian Government. I think it was Captain Stewart, who advocated going through the Taurus Mountains! Would not that rather be taking the bull by the horns? When we find down the Valley of the Euphrates a smooth flat line, so that you can almost lay the rails on the ground, when we find a line of that sort, to be laid at a minimum of expense, and worked to a maximum of advantage, is it worth while to go out of our way, and incur unnecessary expense in boring through the Taurus Mountains?' As regards the question of steamers protecting the flanks of our communications, I think there must have been some little mistake, for there was nothing in the paper on that subject. I do not know how that idea arose; but we may trust the terminal ports of the Euphrates Valley route, in the Mediterranean and in the Persian Gulf, to the protection of our gallant friends of the Navy.

The Austrian War Minister with great foresight has shown us a very good example in looking forward for a series of years to the objects and proceedings of the Russian Government. Ever since 1858, he seems to have had his eye on their movements, and he has thus been able to foresee and foretell what they have subsequently carried out. In conclusion, and with reference to his writings, I would observe, it is devoutly to be wished that we had some heaven-born War Minister in this country, who like Bismarck and von Roon of Germany, and Cavour of Italy, would keep these sort of questions always in view, who would lead, instead of bowing to popular or parliamentary opinion in reference to them, and who would command the necessary influence to carry them forward, when of such supreme national importance, to a successful issue, to the great future advantage of this country, and of that Eastern Empire, whose destinies it has pleased God to entrust to its guidance, government, and development. Such possessions carry their responsibilities with them; and I firmly believe, as I stated many years since in a lecture on "The Routes to India," in this room, that the improvement of the communications through the countries lying

between Europe and India is one great object to be achieved, and one great reason for the common possession of Great Britain and India by the Anglo-Saxon race.

The CHAIRMAN: Ladies and Gentlemen, I venture to think I only represent your feelings when I say we have derived great gratification and instruction from the very able and lucid statements of Mr. Andrew, so ably read and commented upon by Captain Tyler. I hope you will join with me in voting our thanks to Mr. Andrew for his paper, and for the justice which has been done to it by Captain Tyler. I am sure that you will also agree with me that we are very much indebted to the various gentlemen who have given their opinions on this occasion; and although there may have been differences of opinion, yet it is always best in our country to hear all sides of the case, especially as they all point to one great object, a rapid, safe, and quick communication between England and her best and most valuable possession, India.

Monday, April 21st, 1873.

ADMIRAL TARLETON, C.B., Lord of the Admiralty, in the Chair.

NAMES of MEMBERS who joined the Institution between the 7th and the 21st April, 1873.

LIFE.

Littledale, H. W. A., Lieut. R.N.
Jocelyn, W. H., Lieut. R.N.

ANNUAL.

Bouverie, Henry H. P., Lieut. West Somerset Yeo.
Barnett, Henry, Lieut.-Col. Oxford Yeo.
McPherson, Cecil, Capt. 17th Regt.
Burr, C. E. G., Lieut. 17th Regt.
Shepherd, Henry, Capt. 2nd Kent Art. Volunteers.
Simpson, Frank, Staff Assist.-Surgeon.
Todd, J. A., Lieut.-Colonel late 14th Hussars.
Macpherson, J. C., Capt. R.E.
Abbott, Saunders A., Major-General late Bombay Army.

NAVAL RESERVES.

By T. BRASSEY, Esq., M.P., Captain Cinque Ports Artillery.

BEFORE commencing my paper, I may say that it is to me a matter of regret that the Navy is not better represented in Parliament. If there were more Naval Officers in the House, it would be much better for Parliament and better for the Navy. But, at any rate, those who take an interest in the subject must endeavour to learn what they can from their Naval Officers.

I appear before this Institution essentially as a learner and not a teacher. As a Member of Parliament, interested in our naval administration, I most anxiously desire to ascertain what, in the opinion of naval men, are our actual requirements as regards the number of seamen in reserve for the manning of the fleet. The public, and Parliament as representing public opinion, are prepared to provide, with an ungrudging hand, whatever the naval men declare to be essential to our maritime power and security. But it is for the Navy to tell the public what our requirements are.

In dealing with the great question of our Naval Reserves—a subject too vast to be considered as a whole within the narrow limits of a short oral address—I shall say but little of the actual organization of the force. I shall prefer to dwell on points which still await solution, and upon which the opinion and thoughtful consideration of naval men are greatly needed. There are three problems, which I will specially single out for discussion.

First.—What number of seamen ought we to endeavour to enrol, whether in the first or second class Reserve, or as Naval Coast Volunteers?

Second.—To what extent may we venture to rely on the merchant service to provide Officers for our Navy in time of war?

Third.—What are the most effectual means of raising and training a force for the especial purpose of coast defence?

I proceed to apply myself to the first of the three problems, which I have submitted for the consideration of the Institution.

The enquiries, instituted in 1852, as to the probable requirements of the British Navy, elicited the usual divergency of opinions from the Naval Officers who were consulted.

As to that word "usual," I may state that civilians, who have studied Naval Blue Books with the attention I have devoted to that somewhat voluminous literature, must experience great difficulty in taking any useful part in naval matters in the House, on account of the great divergency of opinion therein exhibited. I have to-day devoted two or three hours to the perusal of the evidence which was given before that very important Committee of Officers who inquired into the Life Boats supplied to the Navy, and it is surprising how witness after witness appear to give an opinion totally opposed to that which had just been delivered by the preceding witness. I therefore hope the Naval Officers will excuse my using the word "usual." To return to my subject.

Sir John Stirling estimated that 60,000 men would be necessary to man the Navy in time of war. Admiral Denman, on the other hand, believed that, on the outbreak of a war, a fleet of 100,000 men would be immediately required; but, inasmuch as of the 40,000 employed in 1852 only 15,000 were seamen, he believed that of the 60,000 additional men required for a war Navy, only 23,000 need be seamen.

The effect of modern mechanical appliances, in relation to the manning of the Navy, was scarcely perceived at the time of the Crimean war; but the fact that the number of seamen and marines employed in the British fleet, at that period, never exceeded 68,000, afforded some indication of the coming change.

In the recent civil war in America, the Navy of the United States was increased to vast proportions.

Land defences of great strength were attacked by their ships. An effectual blockade was maintained along 3,500 miles of coast. A fleet of cruisers was despatched in chase of the "Alabama," and other piratical vessels, to every part of the world. To perform these varied services, some 671 vessels were employed; but, such was the effect of modern changes in naval warfare, that the number of men employed in the United States fleet never exceeded 51,000 men.

The blockade of Charleston is one of the most striking examples of the reduced numbers of seamen required in modern naval warfare.

The report of the Secretary of the United States Navy on armoured vessels, published in 1866, contains a despatch from Admiral Dahlgren, dated off Morris Island, January, 1864, in which the following observations occur:—"The completeness with which four little monitors, supported by an ironclad frigate, have closed Charleston, is well worth noting. These four monitors, which thus keep watch and ward, muster eight guns and 320 men, which is almost insignificant compared with the work done."

The conditions of naval warfare have, in our days, been so completely revolutionised that the experience of the past affords but a slight clue to the requirements of the future.

In 1805, a year memorable in our annals for the crowning naval victory of Trafalgar, 114,000 seamen and marines were voted for the naval service. This number was increased, in subsequent years, to 147,000; but it is certain that our naval power derived no advantage from the increase in the numerical strength of our naval forces.

An eminent Officer of the United States Navy, Admiral Goldsborough, has stated, in a memorandum addressed to his Government, that the most effective vessels for coast defence will be swift and handy armour-clad ships without guns, and to be used exclusively as rams. By the adoption of vessels of the type recommended by Admiral Goldsborough, the number of men in our flotilla for coast defence might be materially diminished.

The last Royal Commission on the manning of the Navy, reporting in 1860, had not the experience of the American war, as a guide for determining our probable requirements. But, inasmuch as their report contains the latest authoritative exposition of professional opinion in our own Navy, it deserves attentive consideration.

The following statement exhibits the whole amount of reserve, which they recommended:—

Reliefs in the home ports	4,000
Coast Guard	12,000
Marines embodied	6,000
Ditto, short service pensioners	5,000
Seamen, short service pensioners	3,000
Royal Naval Volunteers	20,000
Naval Coast Volunteers	10,000
	60,000 men

Since the publication of the Report of the Royal Commission of 1859 naval warfare has been almost revolutionised. When, on a recent occasion I introduced a motion in the House of Commons, on the condition of our Naval Reserves, I urged the appointment of a Select Committee to inquire into the subject, mainly on the ground, that in consequence of the immense changes which have taken place, the number of seamen required for the Reserve, could no longer be taken as definitely settled by a report drawn up some fifteen years ago. How great a change has taken place in this regard was clearly shown in the able speech of Mr. Shaw Lefevre, in which he pointed out that, at the date, when the inquiry of the last Royal Commission was held, the flag-ship in the Mediterranean required a complement of from 600 to 700 blue jackets, while for the present flag-ship, the "Lord Warden," 200 are sufficient; and, if the "Devastation" represents the flag-ship of the future, in European waters, then 100 able seamen will do the work, for which, in the good old times of full-rigged three-deckers, a crew of 600 seamen was essential.

I believe I am correct in saying that at the present moment we have

not more than 32 or 33 ironclads afloat, adapted for cruising in distant waters, or for service in which the aid of sail-power may be regarded as indispensable. Some years must elapse ere our ocean-going ironclad fleet can be increased to a total number of 50 vessels. If it be fair to take the crew of the "Lord Warden" as representing the average number of seamen required for one-half of our ironclad fleet; and if the complement of the "Devastation" may be accepted as the normal number for ships of her class; and, to judge from the Naval estimates of the present year, one-half of our new ironclads will be mastless ships; then it would appear probable that we should require for the complements of a fleet of 50 of the most powerful ironclad ships, not more than 7,500 *bonâ fide* seamen. For a fleet of 50 ships of the type, to which the flag-ship in the Mediterranean fifteen years ago belonged, we should have required a force of 30,000 seamen. The inference seems to be irresistible, that in a future naval war we shall not require so many seamen as formerly for our ocean-going line-of-battle ships. Making every allowance, therefore, for the increased importance of the commerce, and assuming that, in consequence of the withdrawal of the troops, the defence of the colonies will be in a larger sense than heretofore committed to the Navy, I venture to submit it, as my opinion, that we no longer require 20,000 seamen in our first-class Reserve. The first-class Reserve now numbers about 12,000 seamen, very carefully selected; and if 10,000 men answered to their country's call, we should find it difficult to make use of their services. Hence, I arrive at the conclusion, that we are in a highly satisfactory position, as regards the numerical strength of our Naval Reserve.

The policy of creating additional means of training seamen for the Reserve must depend mainly on the views entertained in the Navy, as to the strength, at which that Reserve should be maintained. If our present Reserve be really inadequate; then training ships, with brigs attached as sailing tenders, should be at once established, at least in London and Liverpool. If, on the other hand, the actual strength of the Naval Reserve is adequate; then naval reformers will not be justified in urging upon the consideration of Parliament proposals for training young seamen for the reserves at the public expense.

Before I pass to the second subject with which I have to deal, I would invite Naval Officers to say, whether or not they think that the seaman of modern times has deteriorated by comparison with his predecessors. I believe that it is the opinion in the Navy, that so far as that branch of the great marine of England is concerned, the greatly improved system of training which has been established, has produced in the seaman of modern times a very valuable man. But it is well known to Naval Officers that the mercantile marine do not consider themselves quite so fortunate. Whether or no that public opinion is founded upon good and substantial reasons, it is very difficult to determine. One knows that in other spheres of life it is very common to say there is nothing so good as the "good old times," and no doubt that tendency to disparage the present and exalt the past, is manifested in naval as well as in other spheres of society. Speaking as a yacht-owner of some

eighteen or nineteen years' standing, I am bound to say that the class of seamen we employ, I believe now 8,000 in number, do not appear to me to have shown the slightest deterioration.

I desire now to make a few observations on the Officers of the Reserve. There is no profession in which so much talent is lost for want of opportunity for its exercise, none in which so much honourable ambition is doomed to disappointment, as the Navy. The half-pay list contains a multitude of names of Officers without private means, and eager for employment, which is denied to them for the greater part of the best portion of their lives. Can we not remedy this evil by first creating a reserve of Officers in the mercantile marine, and then reducing the number of Officers in the Navy to something like the number actually required in time of peace?

At the present time, young gentlemen, socially qualified, in every way, for service in the Navy, are being educated on board the "Conway," in the Mersey, and the "Worcester," in the Thames. If the Admiralty were to afford to these Officers, after they have passed their examinations as masters and mates, the opportunity of adding to their nautical education, received at sea, a competent knowledge of gunnery, we should have in them an invaluable reserve of Officers.

For this purpose, a short practical course of gunnery and naval tactics should be arranged, in connection with the "Excellent," analogous with the course of military instruction which has been arranged for Volunteer Officers at Aldershot. Eligible young Officers of the mercantile marine should be encouraged to go through the course by the offer of a premium, to be paid to them on their passing a satisfactory examination. The premium should be sufficient in amount to cover the expense of their residence in Portsmouth, and also to compensate them for their loss of time in not going to sea, while remaining on shore for the purpose of study.

The Board of Trade would do much to promote the success of this scheme by raising the standard of examination for the extra-master's certificate, which might be extended so as to include both modern languages, and the more important elements of commercial science. The privilege of going through the course on board the "Excellent" might be confined to those Officers who had passed this higher examination. I would urge the endeavour to raise the status of the Officers of the mercantile marine as an object of high administrative policy, essentially philanthropic in its tendency.

There is no position more full of responsibility, none, in which there are greater opportunities of doing good or harm, than that of commander of a merchantman. In distant seas, far removed from the influence of public opinion, the sea Officer has unlimited powers of raising or lowering the character of his crew, and alleviating or aggravating the inevitable hardships of their lot.

The creation of the Naval University at Greenwich will doubtless do much to facilitate the fusion between the Officers of the Reserve and the Navy, which, from every point of view, is so much to be desired.

Unless it be accepted as an axiom, that young gentlemen should not

enter the Navy, without being possessed of the advantage of considerable private means; the present half-pay system is a serious evil. There should be no half-pay for Officers on the active list. After service at sea, a fair amount of leave should be granted. In all ranks, a year ashore for every three years passed afloat would not be too great an indulgence. If the numbers be reduced, useful employment could always be found for all Officers in the higher ranks of the Navy, in developing the numerous novel inventions for naval warfare, in watching the progress of gunnery, in criticising the recent modifications in naval architecture, or in applying their attention to the safety of life at sea, and other kindred subjects. There is always much work to be done for the Navy and the mercantile marine, with which naval men are specially competent to deal.

From the Royal Naval Reserve and its Officers, I turn to the Coast Volunteers. Recent naval administrators have unaccountably neglected this branch of the Reserves.

The Committee of 1852 recommended a force of 6,000 Coast Volunteers, and the Royal Commission of 1859, advised that the number should be 10,000. According to the latest estimates, the number has been reduced to 600 men. It cannot be said that eligible men are wanting. The latest return shows that 153,000 men, and 14,000 boys are employed in the fisheries of the United Kingdom. In point of physical power and hardy habits, the fishermen are superior to the seamen in foreign trades. Their local knowledge would be of immense value in coast defence, and the fact that they have fixed places of residence, and never sail under a foreign flag, makes it certain that they would always be found when their services were required. Of the moral character of the fishermen, as a body, I can speak with the greatest confidence. The Coast Volunteers are not a popular force in the Navy. The reason is that, for political purposes, the men originally enrolled, were admitted into the service with discreditable laxity.

It would not be difficult to raise, from among our large population of *bonâ fide* fishermen, a Reserve equal to the standard recommended by the Royal Commission. I hope I am justified in drawing the inference, from a perusal of the revised rules, that there is a disposition to induce the fishermen to join—not the Naval Coast Volunteers—but the Second Class Naval Reserve. The means, however, which are proposed for carrying out this policy are inadequate. The fishermen are congregated in isolated communities on various points of the coast. They are men of domesticated habits, and it would be difficult to induce them to join the Reserve, if they had to go to a distance from their homes to be drilled.

The list of ships and batteries at which the Naval Reserve may take their drill, though imposing enough in point of numbers, does not include some of the most important fishing communities on the coast of the United Kingdom. For example, while there are batteries for drill at Poole, where the number of men and boys employed in fishing vessels is only 214; at Maryport, where there are only 69; and at Lynn, where there are only 266; there are no similar establishments

at Sligo, which has 4,800 men and boys in the fishing vessels of the port; none at Skibbereen, which has 5,500 fishermen; none at Banff, which has 5,600; nor at Stornoway, which has 8,000; nor at Wick, which has 8,400; nor at Inverness, which has 9,000 fishermen; and if I were to go round the coast, enumerating the places where the number of fishermen ranges from 1,000 to 3,000, but where there are no opportunities for the men belonging to the Reserve to drill, I should weary you with the enumeration.

The list which I have read is sufficient to show what immense numbers of fishermen are collected at some of the Scotch fishing stations; and these men are, as it is well known, remarkable for their physical strength, hardy habits, and good character.

In view of the importance to the Navy of recruiting in this section of our maritime population, the Manning Committee of 1852, strongly recommended that the Scotch Naval Station should be re-established. Where the Navy is best known, as they truly observed, there the flower of the population are ready to enter it. In 1852, there were more men in the Navy from the village of Cawsand, than from the port of Liverpool; and the return of the counties, in which the boys in the training ships in 1871 were born, shows that out of 2,888 boys, only 90 came from the whole of Scotland; only 112 from Lancashire, including the Isle of Man as well as Liverpool; only 23 from Suffolk; 11 from Norfolk; and 18 from Wales. Can it be supposed that the great seafaring populations, which reside on those coasts have ever been made thoroughly acquainted with the advantages enjoyed by those who serve in the Navy and the Reserve? The fluctuating nature of their occupation would enable the fishermen to attend drill with little inconvenience. The drill could be taught in the most effective manner, and with the least expense to the Government, by sending a gunboat to visit the fishing ports at the slack season. These periodical visits of a smart, well-organized gunboat, would do much to create a favourable impression of the Navy amongst the fishermen. The expense of keeping a few gunboats in commission for this purpose would be nominal; for we have more seamen at present in the home ports, than it is possible to employ in sea-going ships. Some of these men might be attached to gunboats instead of remaining in stationary flag-ships.

The display of the white ensign in the fishing ports would be a more effectual means of recruiting for the Reserve than the labours, however assiduous, of any number of registrars, and the barren exhibition of recruiting placards.

I have ventured to express an opinion that the standard of strength for the first-class Naval Reserve would not be inadequate, if maintained at 10,000 men. But for the coast defence force, I cannot regard the number proposed by the Royal Commission, in 1860, as beyond our necessities. Though naval warfare may be changed, the services of men well acquainted with our own waters must always be invaluable, whether to man our gunboats, to lay out torpedoes, or even to fight heavy ordnance in batteries on the coast, and to co-operate with the military forces in operations on shore.

To some it may appear doubtful whether all the dash and *élan*,

required for naval operations, is to be found among the stay-at-home people, who earn a livelihood in our fisheries. Had they seen, what the author has often witnessed, the agility, the seamanlike resource, and the nerve, which these men never fail to display, in the ever-varying incident and adventure of sea-life, they would no longer doubt their aptitude, if properly trained, for every duty which the crews of our coast flotilla may be called upon to perform.

The enrolment of fishermen in the Reserves has been advocated by our most experienced naval reformers—by Sir Charles Napier; by Admiral Berkeley; by Sir William Hall; by Admiral Hastings; by the late Sir Alexander Milne, and by many other most distinguished Naval Officers.

Sir Charles Napier proposed that our Steam Reserves should be stationed at the different ports; that the Officers and crews of the Coast Guard should be on their books, and that their complement should be completed from the boatmen and fishermen on the coast.

Admiral Berkeley, who had devoted the greatest attention to the manning of the Navy, was strongly in favour of the enrolment of fishermen in the Reserves. They were, in his view, to be regarded, as a sea militia, to be employed for coast defence in steamers and steam gunboats, not to go beyond the channel. He advised that they should be called out periodically, and that they should be clothed when so called out; and that they should be paid on a corresponding scale—*cæteris paribus*—with the land militia.

Admiral Berkeley expressed the most implicit confidence in the fishermen, as a body of men who could be organised, as a sea militia, for coast defence. With these men behind him, he declared that he should be perfectly satisfied to take his share in the responsibility of defending our shores, and making the channel a place of refuge for our flag, until more extensive means were adopted for manning the fleet.

Admiral Hastings, one of the witnesses examined by the Commission of 1852, gave similar evidence, to the effect that the fishermen would be well adapted, on an emergency, for the naval service; and that their stationary habits were a strong point in their favour.

Captain Oliver, another witness before the same Committee, whose recent connection with the Coast Guard had given him peculiar opportunities of observing the fishermen in various parts of the coast, spoke of the fishermen of the Isle of Wight in the following terms:—"At South Yarmouth, a notorious smuggling district, which I commanded for six years, the terms fisherman and smuggler were synonymous; yet I could not but respect them as a noble as well as a hardy race. I consider fishermen, generally, of very domesticated habits."

The most desirable men for the Coast Defence Sea Militia are to be obtained at Penzance, Brixham, Brighton, Hastings, Folkestone, Deal, Barking, Colchester, Lowestoft, Yarmouth, Cromer, Berwick, Dunbar, Newhaven, Anstruther, Aberdeen, Peterhead, Cromarty, Wick, Shetland, Orkney, and the western islands of Scotland.

When the Officers of the Coast Guard were consulted on this subject, in 1852, many of their number recommended the fishermen as being highly qualified for service in the Coast Defence Corps.

The rules for admission into the Coast Volunteers should be so framed as to require only such seamanship as every experienced fisherman must possess. Training in gunnery and small-arm drill are the only additional qualifications needed, to make our fishermen thoroughly useful in the Coast Defence Flotilla.

I am happy to observe that, in the recent revision of the rules and regulations for the Naval Reserve, the conditions of entry for the second-class Reserve have been judiciously modified, so that the fishermen will now be eligible for enrolment.

The training should be given afloat, and, in order to propitiate the local sympathies of the fishermen, the gunboats, which they would be employed to man in times of war, should be permanently stationed at the ports in which their crews are respectively raised.

Officers should be selected to command the Coast Defence Reserve, who have exhibited special aptitude for that branch of the service. They should reside at the principal fishing ports, and be permanently attached to the Coast Defence Service. By these means they would have the inestimable advantage of being personally acquainted with the men under their command.

In his evidence on the manning of the Navy, in 1852, Admiral Berkeley stated that special care should be taken in the selection of Officers for the Coast Defence Service, and that it was essential that all the Officers, and particularly the Commanding Officer, should be accustomed to the fishermen and they to him. In addition to the proposed drills in gunnery, and the use of small arms, it would be highly expedient that Officers and men should make themselves locally acquainted with the channels and entrances to the harbours in their respective districts, and be instructed in the use of the torpedo, and its application to coast defence.

The appointments in this service should be liberally paid, and—in consideration of the advantages of a higher rate of pay and a fixed place of residence, the latter a great boon to a married man—Officers in the Coast Defence Service ought to be content with a slower rate of promotion than that accorded to their brother Officers, serving on foreign stations.

The annual drills afloat, and the musters of the Coast Defence Flotilla for inspection by the Divisional Captain of the Coast Guard, or for inspection, in larger numbers, at naval reviews, would secure the continued efficiency of the Officers of the Coast Defence Service in seamanship and navigation.

In addition to the various descriptions of forces already enumerated, an attempt has been made to extend the Volunteer movement to the Coast Defence Service. A corps, composed, at present, of 100 gentlemen employed in banks and private offices in the City, has been provisionally enrolled, and several hundred additional applications for admission have been received. The Volunteers actually entered have attended drill on board the "President," and I am enabled to state that, in the opinion of the instructors, they are the most intelligent and the smartest gunners who have ever been drilled on board the ship. A gun's crew of fifteen gentlemen have recently passed out as trained

men, and the senior instructor tells me that they are unquestionably the very best gun's crew, who have ever been drilled on board the "President." The movement has extended itself to Liverpool, where the First Lord of the Admiralty did so much to initiate it by an encouraging speech. It remains to be proved whether the idea can be carried out in a practical shape. Not until the Volunteers have been afloat in a gunboat for a few days, and have shown their ability and readiness to perform all the duties, which devolve on the crew of a gunboat, shall I venture to regard the experiment, with which I have the honour to be associated, as an accomplished fact.

The experiment, however, of sending landsmen afloat has been tried on the American lakes, where in the seasons of 1871 and 1872 three batteries of artillery were embarked in the dominion gunboat "Prince Alfred," remaining afloat, each battery for fourteen days, cruising on Lakes Huron and Erie, and taking part in the military manœuvres, which were carried out by the Canadian Volunteers under the command of Sir Hastings Doyle. I can quote another example of the readiness with which landsmen adapt themselves to some descriptions of sea-service. In the herring fisheries off the coasts of Norfolk and Suffolk, boats are manned, to a large extent, by agricultural labourers. In hauling in the herring nets, the crew have to walk a distance of eight miles round the capstan every morning. It is obvious that men, who can perform such an amount of labour on board a herring-boat, would be perfectly fit for a gunboat.

Much of the success of the Naval Volunteer movement much depend on the readiness of the Admiralty to afford the necessary facilities. The most immediately pressing matter is the appointment of a commanding or inspecting Officer. Until the Admiralty place a naval man of rank and experience at the head of the Volunteers, an invaluable aid to efficiency will be wanting, and the formation of a contingent at many of the ports round the coast will be indefinitely delayed.

I have received applications from Southampton, Dundee, Wales, Musselburgh, Harwich, and Bristol, for assistance and advice. It is very desirable that a Naval Officer should be available to visit these localities where a disposition exists to organise a local corps of Naval Volunteers, and I am happy to be enabled to state that the appointment, which I so earnestly recommended, will shortly be made.

The appropriation of a gunboat for the instruction of the members of the London contingent is equally indispensable to the success of the Naval Volunteer movement. Practice in firing at a target afloat, and in working a gun mounted on a gunboat is necessary for efficiency. On the other hand, the opportunity of spending a week every year on the water is essential to the popularity of the movement. In a time of profound peace, and in a country, in which the principle of compulsory military service has not been accepted, men will not volunteer for the somewhat laborious task of going through an annual course of naval gun drill, without some inducement. That inducement, in the case of the most earnest men, who have joined the Volunteer movement, has been found in the hope, in which they have indulged, that they would

thus obtain the opportunity of spending a few days afloat every year. The gunboat appropriated to the Volunteers in the Thames might also do duty as a tender to the "President," the drill-ship of the Naval Reserve in the London district. Hitherto, none of the seamen belonging to the Reserve in the Port of London have ever had any practice in firing at a target afloat. At Liverpool, on the other hand, a gunboat is attached to the drill-ship, in which the seamen of the Reserve are regularly exercised. The Volunteers would not urge upon the Admiralty the expenditure of money especially on their behalf; but the inconvenience of attending drill in the West India Docks to gentlemen, whose usual pursuits are in the City or the West-end, is so great, that the London contingent can never become very numerous, until more suitable arrangements can be made. A gunboat of the "Comet" class, moored off Somerset House, would afford the necessary facility, and would cost less than fitting up a wooden ship of larger tonnage. Gun-drill could not take place on board in the winter evenings; but, at that season of the year, the evenings should be devoted to cutlass and rifle exercise, and the gun-drills might take place on Saturday afternoons, when the Volunteers could conveniently attend.

We have now considered the Reserves of all classes, which it is possible to raise on our shores; but the naval resources of Great Britain are by no means limited to these islands. I have returned from a recent visit to our North American colonies, strongly impressed with a feeling of regret that no attempt has been made to encourage the colonists to form reserves among the hardy mariners, who sail under the British flag in North American waters. We have not hesitated to enrol our coloured fellow subjects in the land forces in many dependencies of the Crown. Why should we not encourage the colonies to form a Naval Reserve for the defence of their own coast?

In the Canadian dominion and Newfoundland, there are 87,000 seamen and fishermen, of whom one-third belong to Newfoundland alone. The fishermen are compelled, by the inclemency of the season, and the closing of the navigation by ice, to remain at home for a considerable portion of the winter. A gunboat might be stationed at St. John's, and another at Halifax, for the purpose of drilling the colonial reserves, gradually proceeding from harbour to harbour on the Atlantic coast in winter, and ascending the Gulf of St. Lawrence at the approach of spring. The local reserve might be drilled in the slack season of the fishery, and before the navigation became completely open from the melting of the ice. With some aid and encouragement from the mother country, it appears to be perfectly feasible, and most desirable, for the Canadian dominion and the adjacent colonies to organize a force for the defence of their coasts. I throw the suggestion out for the consideration of the Government at home, and the authorities in the colonies.

Lastly, the formation of an able staff of Inspecting Officers for the Reserve is essentially necessary to secure their efficiency. The Reserves, including the Coast Guard, now number not less than 20,000 men, surely the supreme command of such a force is a task worthy of the

most distinguished Admiral in the service. The Commander-in-Chief should be supported by a staff of Officers, to whom should be assigned the command of the Reserves in the St. George's Channel, and on the east coast of England. While, hitherto, there has been no inspecting staff for the Naval Reserve, a very different policy has prevailed at the War Office in providing a staff for the inspection of the land volunteers. An Admiral sent on an occasional tour of inspection, is not a sufficient substitute for an Officer specially devoted to the duty, and whose representations as to the requirements of the Reserve would receive an amount of attention at the Admiralty, which could not be secured by any other means. The Commanding Officer of the Reserves would always feel that his professional reputation was intimately involved in the success or failure of this branch of the *personnel* of the Navy.

In urging the appointment of a staff of Superintending Officers, I do not undervalue for a moment the services of that admirable body of men, the seamen instructors in gunnery in the drill ships of the Reserve. It is impossible to speak too highly of their zeal, their intelligence, their discipline, and their consummate knowledge of the subject, on which it is their duty to give instruction. But Naval Officers, judiciously selected, would exercise a higher influence over the *morale* of the Naval Reserve. The merchant seamen would feel themselves, in a larger sense than heretofore, an integral part of the Navy in England. They would be inspired by its great traditions, and the confidence which they would acquire in the Officers, under whom they received their training, would be an invaluable guarantee for their conduct and discipline, should they ever be called upon to serve in Her Majesty's fleets.

Commander GILMORE, R.N.: I think, Sir, that I may speak of the Naval Reserve with some authority, having had Naval Reserve men under my individual command more than three years. I cannot think that the Naval Reserve will ever be fit to take the place of our own seamen on board our men-of-war. Our own seamen are educated from their boyhood, and are brought into the Navy at an early period. Merchant seamen, on the contrary, come in at all ages and are perfectly undisciplined, and they appear to come into the Reserve merely to receive 6*l.* bounty, and so much grant. It is well known that in 1868 when the Reserve were called out, out of 16,000 men supposed to be enrolled, only 1,700 put in an appearance on board the Fleet at Spithead, and those men had been further induced to come by being presented with two suits of clothes. Mr. Brassey speaking about the "Alabama" and "Charleston," and the American war, states that four monitors were sufficient to blockade Charleston. (Mr. BRASSEY: I was quoting the passage in the despatch of the Admiral.) Four monitors were sufficient, for the Southerners had no men or ships to force the blockade. Then, on the question of rams, there were only two cases in the whole of the American war in which rams were used, and one case in the Italian war. Mr. Shaw Lefevre said, that in the old time 700 men were a complement for a ship; but the "Lord Clyde" never had so few as 200 men as her complement. Archidimadas, the Spartan, said, in the old time, he required enough good men to keep bad men away from the shores of Sparta. But to keep bad men away from our shores we must have sea-going ships fully masted, and our present complement of seamen is not nearly sufficient to man these ships. The Naval Reserve, willing as they are to carry out their duties, are undisciplined, and as far as I know from their appearance, unequal to the carrying out of naval duties. The Coast Volunteers, who were 10,000 at one time, are mostly composed in the Welsh districts of men from Cardiff and Newport, nearly all miners, and Irishmen; on board the "Revenge," out of 1,500 men only 135 could go aloft. Some few of the Naval

Reserve men that we had, had been seamen in their time, but the majority had left the sea and were fishermen, stokers, engine-drivers, hotel porters, butlers,—anything you like but seamen. The same thing occurred in Scotland. There Captain Fellowes found—you will find it in the Admiralty Report—that nine-tenths of his men were actually employed on shore; they were, as I said before, hotel porters, stokers, men on the railways, while others were fishermen. Men came on board and said they had been seamen; they produced in the first place, certificates of having served at sea, and thought there was nothing further required of them save to drop in occasionally just when they chose. If they found the service was agreeable to them, they stopped and came the next year for their drill; but if Officers were unpleasant and required them to do their duty, they went somewhere else, went to Southampton, and if the people at Southampton were not pleasant, they went to Wales. My experience was in Wales, and I can assure you, that I consider that the Naval Reserve men now, are no more fitted to take their place on board a man-of-war, than a sweep is fitted for the post of colour-sergeant in a regiment. They were perfectly undisciplined, they were not seamen, were perfectly undrilled, and they took every possible means they could to stir up indignation and insubordination among the crew. The coalheavers and pitmen from Cardiff and Newport when they came tried to do their best; the other men came with the idea that they were perfect seamen, and that they were entitled to come on board and take the position among our men, that they did. The pay was better, their duties were less, and they had only eight hours drill in a day, no drill on Saturday or on Sunday. The whole of their emoluments amounted to 9½*d.* an hour. I believe our Reserve must in future be brought up in the Navy from boys.*

Captain WILLES, C.B., R.N.: My excuse for speaking this evening is simply that, for three years and a half, I superintended, at the Admiralty, the Coast Guard and Naval Reserve (during the temporal absence, I may say) of our gallant chairman from Whitehall. In the first place, I must on the part of the Navy thank Mr. Brassey for the very great interest he takes in naval affairs. We are only too glad to see an honourable Member, who will bring naval matters before the House, and discuss them fairly, as he does; and we hope the time is not far distant when he will hold an important post, either at the Board of Trade or at the Admiralty. Mr. Brassey has, indeed, in his interesting lecture, raised some most important questions, and I fear that, in endeavouring to touch on some of these, I may exceed the limited time allotted by the rules of this Institution. Ten hours instead of ten minutes would still leave much unsaid, and I therefore trust I may meet with indulgence, should I be led to transgress. Mr. Brassey has alluded to the fact of there being so few naval Members of Parliament. I shall be very glad if he, or anyone else, will tell me how that is to be remedied. To begin with, we are, as a rule, poor men, and secondly, it is very difficult for us to serve our profession and Parliament also. If we go into Parliament we must take a party side, and this too often, injures our professional career. At the same time I think it is unfortunate for the service; that we are not, like the Army, numerously represented; for, although I have a great respect for Members of Parliament in general, it is almost impossible that any man should discuss, with advantage, purely technical questions of which he has had no personal experience. The retirement scheme of Mr. Childers I believe to have been for the good of the Navy generally, but it increased the difficulties in the way of Naval Officers sitting in Parliament. An Officer cannot well enter the House until he is qualified for flag rank; then, after a few years, he either must treat his constituents badly by resigning his seat, when he wants to hoist his flag; or relinquish the service altogether.

Mr. Brassey alluded to the remarkable divergence of opinion prevailing amongst Naval Officers. Well, it is certainly to be regretted, but cannot be remedied. We go to sea when very young, under different kinds of Officers. We often imbibe our ideas entirely from them, and they may be said to influence the whole of our future

* These, after a certain number of years' service in the Navy (not less than 12 years), should be discharged into the Reserve with pensions according to length of service; they might begin on 6*l.*, the amount of retainer paid annually to each man in the Reserve.

career. I particularly remember,—for I was one of the Lifeboat Committee alluded to by Mr. Brassey, when the diversity of opinion, as the evidence given by the witnesses shows was so remarkable.

Mr. Brassey invites Naval Officers to state what number of seamen, as a Reserve, would be required in case of war? Now, that is one of the most difficult problems he could possibly put forward. What war is it to be? Is it to be a maritime war or a European war? That is to say, is it to be a war with America or a European power? If it was war with the latter, I believe, to commence, we are well provided, but if it is war with America, then we should have to cover the sea with "Alabamas" to protect our commerce, and he would be a very clever person who could say how many. Then comes another question. What is to be the ship of the future? If the "Devastation" is to be the type, the number required would be very small; but I believe the time is not very far distant, and that there are some of the younger members present who will see it, when armour will be entirely taken off our ships. We may not go back to three-deckers, but I believe we shall return to frigates and corvettes with many guns and large crews; then we should require a very large number of men in the Reserves. But looking at the "immediate future," an expression made use of by Lord Dufferin's Committee, which sat at the Admiralty last year, I believe we are tolerably rich. If the Naval Reserve could be raised again to the number which the Admiral in the Chair left in 1869 (namely, 16,000), with our Coast Guard and our Pensioner Force (which is very considerable), I think we might be quite happy. But the question is, how to keep up that 16,000? It is a very important subject. When the present Government came into office, I think the naval representative, Mr. Childers, held the opinion which I was sorry to hear Commander Gilmore again express this evening, of the Naval Reserve, and, you will remember, he called them out on a Whitsuntide cruise. It was a very bad time of the year, and we only collected 1,600 or 1,700; but Mr. Childers came back from that cruise convinced that, whether it was right or whether it was wrong to establish the Naval Reserve in the first instance, it never should be abolished. Admiral Key, who commanded the squadron, pointed out certain defects in the system, and he certainly did hit upon some of the blots mentioned by Commander Gilmore. The consequence was, a Committee sat at Whitehall (of which I was a member), and recommended considerable modifications, in order to remedy the evils pointed out by Admiral Key and other Officers. What was the result? These restrictions, as they were called by Mr. Brassey, reduced the force to 11,500 men, but these 11,500 men were certainly prime seamen. In the meantime other difficulties arose, and there was no greater one, than the Suez Canal. The Suez Canal has indirectly hurt our Naval Reserve, because, for the moment, it has swept away a large number of sailing ships, and has increased the number of steamers immensely, and the steamers that now go to India, China, and Australia through the canal, are manned by inferior seamen, who are not qualified for the Naval Reserve. Again, the increase of steamers in our home trade has acted against us. I was at a seaport the other day, and meeting an old shipmate, I asked him why he had not joined the Naval Reserve. His reply was, "It is impossible now, Sir. We cannot take our drills. These steamers along the coast come in, and go out of port again; so rapidly." So great is the competition, that their cargoes are taken out and the vessels loaded again and started; frequently in 48 hours, so that the men have not time to take their drill. Therefore, we have the Suez Canal and the immense increase of our steam commerce acting against us, and how the Naval Reserve is, under the circumstances, to be raised even to 13,000 efficient men is a puzzle.* I have been absent some months from England, and therefore only to-day, read Sir Frederic Grey's pamphlet, and if anybody here has not read it, I would advise him to do so. I was

* Return from Board of Trade, 21st December, 1872, points to a considerable decrease in the crews of steam vessels, thus—

Proportion of *men* to 100 tons.

1854—7·47
1869—4·92
1870—4·67
1871—4·55

in the House of Commons when Mr. Goschen made the speech which Sir Frederic Grey alludes to, and for the moment I thought Mr. Goschen was right. He said that he did not consider it any part of the duty of the State to educate sailors for the mercantile marine. But it must, sooner or later, be done. Sir Frederic Grey says, very truly, "We must keep up our Naval Reserve." You cannot go back to the navigation laws. The competition is so great you cannot introduce apprentices forcibly into the merchant service, and therefore the State must help the mercantile marine. The men that we want for the Naval Reserve of the future must be trained men, for the gallant Admiral very properly points out, that those who were collected together in the panic of 1859-60 are not what we want now, and therefore, as the State gains by the competition and extreme riches of the country, produced, I believe, in a great measure by the abolition of the navigation laws, the Chancellor of the Exchequer must eventually spare a part of his surplus to assist the mercantile marine; and the men, in some way or other, must be passed through a short course of training in a man-of-war. How it is to be done I cannot tell you, for I know well, and so does the gallant Chairman, that, at this moment, we do not know what to do with the boys we are obliged to train for the Navy, for we have now to train every one of our seamen from boys. Instead of the merchant service being, as formerly, a nursery for the Navy, it is just the reverse, and positively the establishment of this very Naval Reserve, giving the men 10*l.* a year, tends to keep them out of the Navy. But it is a necessity. The Naval Reserve cannot be abolished, so that the sooner the State takes it up the better. We must have a larger force at sea in the Navy. We must have more unarmoured ships; we must have more regular training ships, and there must be a regular system for our Reserves, as our lecturer has said, under some distinguished Commander-in-Chief. I gather that Mr. Brassey rather finds fault with the Admiralty for abolishing the Naval Volunteers. All I can say is, they were abolished on the recommendation of Admiral Tarleton and the Captains of the—in *those* days—Coast Guard, now, first Reserve ships. And I believe, so far as the coast of England is concerned, it was right; but I do think that they might be kept up in Scotland still, to a limited number. The report from the west coast, when I was at the Admiralty, was in their favour. I think they might be maintained at about 2,000 in number there, and that was the determination of Mr. Childers, before he left the Admiralty. Then comes the very difficult question, "what are we to do for Officers in case of war?" I daresay Mr. Brassey is aware that every Naval Officer, whether on half pay or retired pay, can, by the power now extant, be called upon to serve in case of an emergency; therefore, I think that it would be possible to get the necessary Officers. They would be a little rusty, no doubt, but I believe many and many a young Officer who, for private reasons has retired from the Navy, would gladly come forward in case of an emergency, and therefore the Officer difficulty may be got over. (Mr. Brassey: The half-pay difficulty.) Yes, that is the point. Well, the half-pay difficulty is an immense one. How to keep Officers efficient for war is what no one can say. You cannot have a larger force. Parliament say, "We will give you 60,000 men and the proper proportion of Officers." You cannot have any more, and yet if war breaks out to-morrow, that force must be trebled or quadrupled; but that we could get Officers better than in the last war I thoroughly believe. One of the last points that Mr. Brassey has alluded to is, what I might call, "amateur sailors." I see that, during my absence abroad, Mr. Brassey has been trying to establish amateur sailors. (Mr. Brassey: Not sailors.) Amateur Officers. Well, I am very sorry to see it. I protest against it most strongly, and I hope my brother Officers will protest against anything of the sort. The Army has just given them up, and I really think in the present day, with our experience, the idea that amateur Officers would be efficient is utterly absurd. What is war? If war consisted of this: that an ironclad—notice having been given by electric telegraph—was coming off the port of Liverpool to wait until the amateur Officers could be got together to go out to fight her, that would be a very simple matter, provided they were not sea-sick. Fighting is not pleasant, but it is over in a few hours. But we all know that, in reality, war is quite a different thing. You have months and months of waiting, and at last the opportunity comes. Do you suppose for one moment you could take these young barristers and other gentlemen from their occupations for the period of eight, ten, twelve, or fourteen

months on the chance of there being a fight at the end of that time for a few hours? I cannot think it. I do not think we quite understand what war is, and so if you will allow me I will read you a few figures I have copied out in order to remind you. The Prussian war was sharp, short, and decisive. The total number, killed, wounded, and missing, was 127,000; died by sickness alone, 12,000. In the Crimean War, the French would not give their number of dead, but 309,000 men were sent to the Crimea from France, of which number 200,000 entered the hospitals, 50,000 only of that number for wounds. I mention these points to try and urge Mr. Brassey to let these amateur Officers—Naval Artillery Volunteers I find they are called—fall through. They will never be of any advantage, and I hope and trust that the State will not have to hand out money for them, because it will be eventually so much out of the Naval Estimates.

Captain COLOMB, R.N.: Mr. Brassey, although he appeals especially to Naval Officers, feels quite as strongly as Naval Officers do, that this question is an imperial question—one which Naval Officers are not likely to view from a broad stand-point—not from the stand-point from which it ought to be thoroughly and clearly viewed. When the lecturer spoke of the Navy not being represented in the House, I could not help thinking as I listened to him, that if we had not naval Members we had, at least, a very fair representative of one in the person of Mr. Brassey. The divergence of naval opinion was adverted to by Mr. Brassey, and was to a certain extent confirmed by my friend Captain Willes. My experience of that divergence is this, that it is a divergence on the surface, and that if you bring two naval men of apparently completely opposite opinions together, and go a little below the surface—a little below the mere words that they happen to utter at the moment, you will find that there is a very much greater consensus of opinion than you would have at first supposed. And I have very good reason to say that, for I was a member of a Committee on a certain subject, where the papers we had before us consisted, in great part, of the reports of two previous Committees on the same subject, and of the witnesses who had been examined, and I may only indicate the general divergence of opinion by saying that, in one of these Committees each member sent in a separate report, and stated that their desire to fulfil the directions given to them was the only point upon which they were unanimous. We dealt with the subject in question, and having spoken to different members of that Committee since, I find that the manner in which it was dealt with, met the views of, I think, the whole of them. I do not think that we must take American experience at all, unless we take it as making for an increase of our naval force. I think if we were to go to the Chancellor of the Exchequer about next October, he would tell us what the result of not having a sufficient naval force might be for us, because, I presume, we should not be in a position to call upon another country to pay over to us three millions for our own neglect. The American commerce, as we all know, entirely disappeared from the seas, simply because she was not prepared for a naval war.

The strength of the first-class Naval Reserve, Mr. Brassey sets at 12,000, and considers it satisfactory, and I understand him further that he would diminish it by 2,000, and that he thinks 10,000 would be enough. Now, I agree with Captain Willes most distinctly and strongly on the point. I understand him to say, that in some way, we must incorporate the mercantile marine; either by transfusing from the Mercantile Marine into the Navy, or from the Navy into the Mercantile Marine. I feel that now most strongly, and I think it has a larger bearing than that which concerns the Navy immediately. I think that we have, in recent events, very clear proof that unless the Government does take some steps towards assisting the Mercantile Marine in the manner suggested by Captain Willes, that great service will go on deteriorating, as we have some reason to fear it is doing now. Mr. Brassey asks, have our own seamen deteriorated? I think we should find, if we took Naval Officers and examined them superficially—as I have stated—that some would say they have, and others would say they have not. But I think if you went a little closer and cross-examined them, they would say, "We never were in so fine a condition as to our seamen in the Navy as we are at this moment—taking the individual seaman." The point as to the Officers of the Reserve, as Captain Willes says, is a very difficult one. I think that carrying out the policy of diminishing the number of Naval Officers who are on the Navy List, and who are, therefore, intimately con-

nected with, and interested in, the Navy, we run some very great risks. I will only give an instance which has come prominently before my mind since I came into this theatre. A little time ago, Colonel Valentine Baker read a paper on "the employment of cavalry" before this Institution. Not only the theatre but even the gallery was filled. There was no room for any outsider to have found his way in in any direction. Now, I should like to know whether "the employment of cavalry" or "the state of the Naval Reserves of England" is the more important question. Again, I should like to know how many Naval Officers on the Active List have been able to attend to hear this great question discussed. And I say that you run that great danger, and it is a very serious danger, by the diminution of the numbers of Naval Officers on the Active Lists that you do not get *numbers* sufficient to put the naval view forward, and that, consequently, the naval view is not heard as it ought to be. We come next to the Coast Volunteers; and I think Mr. Brassey, unless I am very much mistaken, is under a misapprehension as to the chief reason of the unpopularity of the Coast Volunteers. The objection I have always heard alleged against them has been that they were under a peculiar engagement—they were not liable to be called beyond a certain distance from the coast of England. That I have always understood to be the real objection to the force. Far-seeing men argue that in time of war, when you had got men, you could not pledge yourself that you would use them within a certain distance of the coast of England. You might want them anywhere. That, I have understood, was the real objection.

This brings me to another important point which Mr. Brassey has brought forward. I have viewed, with the greatest alarm, the growing feeling in England that our defence is round our coasts. Now, in the old times of our country's history, it was a coast defence certainly that we used, but it was a defence on our enemies coasts, to prevent them leaving their harbours, and that, I am certain as I stand here, is our true policy still.

Then, Mr. Brassey advises that our Coast Volunteers should be increased and our first Reserve diminished, as I have before noticed. If you enter these hardy fishermen; and if you spend money, time, and trouble in training them, and if you engaged that they shall serve on board your ships not at a certain distance from the land, but where you want them, then I agree with Mr. Brassey that you have, in those men, a most valuable force. But if, on the other hand, you are looking to train them merely for coast defence, I should be afraid. I had the pleasure, the other day, through the kindness of Mr. Brassey, of seeing his Volunteers; and I am not prepared to agree with Captain Willes in his remarks upon that force, because, although the force may be small, and may not be capable of doing much, it always would be small in any case, and though it might cost a little money, yet in these times, I do think that however and wherever you can get the public really interested in the Navy, he who does it, performs a really good office, and for that reason I hope that Mr. Brassey will succeed in extending his Volunteers.

Captain J. C. R. COLOMB, late R.M.A.: With your permission, Sir, I should like to make one or two remarks. Mr. Brassey invited discussion upon a number of points, which were not only of importance to the Navy, but to the country at large. First of all, Mr. Brassey invites discussion with regard to the required strength of our Naval Reserves. Next to the efficiency of the Reserves: There can hardly be a more important question than the number of the Reserves this country requires to meet the emergencies of war. Now, the strength of your reserve must have some relation to the strength of your force, and again, the strength of your force must have a very intimate relation to the strength of the force against which it may have to contend. Taking that principle, in order to form a rough estimate, and to raise, if possible, or to continue a discussion, which is of great importance, and with the view of fixing the necessary number of the reserves, I should wish to say, that there are two classes of war which materially influence the strength of the Reserve. The one is an European maritime war, which would lead to the actions being fought in armoured vessels. A war of European Powers would call certain forces into operation—forces and fleets which would take part in actions as a combined force. But, if you take the case of an American war, the circumstances are totally changed. Let us take the first case—a war with European Powers—and see what forces can be brought to bear against us. I think it will appear that the number of guns in ironclads that

could be brought to bear upon this country, amounts to about 1,800. Therefore, taking that as a rough estimate 1,800 guns may possibly be opposed against you, by a combination of all the civilized Powers of Europe; you may fairly suppose that 1,800 of our guns would be a fair match, and, therefore, basing an estimate on the number of men required for the guns, you get at something like a possible calculation for the number of men you probably would require for manning the Fleet to oppose a European combination. But if, as it is not at all within reasonable probability that the whole of Europe is going to be arrayed against us, you take, two-thirds of this total number of guns, you will find that the number of men required for our ironclad Fleet would be 40,000. (Mr. BRASSEY: How many of the 40,000 need be *bonâ fide* seamen?) That of course is another matter. I was merely speaking of the numerical strength. I will come to the question of the quality of the Reserve after I have spoken of the numbers. Passing on from that to an American war I doubt whether it is in the range of possibility to decide how many men we should want. Having the present American Fleet as a guide it appears that we should have to launch about 20,000 men—that is, calculating 20 per gun, and gun for gun with America. But there is no doubt that is a false estimate, because the number of vessels that would be launched as "Alabama's" and war vessels is a thing we cannot calculate.

Now, with regard to the quality of the Reserve. From some experience on board ship, and with military forces regular and irregular on shore, I confess that I regard, with considerable apprehension, the numerical question of the reserves taking too prominent a place. I think it is a matter of very serious importance that discipline should be the thing to which we should, first of all, look. Now, where men are only brought together for a short period of training, it is very hard to get discipline. Drill is not discipline; the training of men at a gun is, no doubt valuable and good, but you must not compare a man only so trained with a man who has been for years under discipline. This was shown very forcibly at the siege of Paris. In Paris, for three months, they were training gunners night and day. No opportunity was neglected to create an efficient force of Artillery to hold the forts. After three months of training, night and day, the hour at last came when the training was to be put to the test, and those who remember the account in the *Times* of the fall of Fort Avron, will agree with me that it is discipline and discipline only, that will enable gunners, however well trained to stand the brunt of war. If I am not detaining you too long I should just like to read a passage from this account, and I would beg you to bear it in mind when considering the question of our reserves: "A deserter who has come in says, that when the projectiles from the "German artillery began to fall on Fort Avron there was dreadful consternation "among the new artillerymen who served the guns." *These were men who had three months' training night and day.* "No good artilleryman would have given up "such a position after one day's firing. I repeat that it is this giving in after a few "hours' firing surprised the Germans, and can only be accounted for by the stuff of "which the gunners were made, or perhaps it would be fairer to say by the fact that "they had not been sufficiently trained." Now, they must have known their duty after three months, but they had not the discipline; and I call your attention to that statement for the sake of showing that the mere fact of providing training at short periods may make a man handy at a gun—may make him know his duty at a gun—but unless you have had a sufficiently long opportunity for instilling into that man habits of discipline, in the hour of your great distress you may find that although he is a trained man, he is not *all* the man you want to fulfil the duties required of him. I was exceedingly glad when I came into this room, knowing what the lecture was to be, to see that map; for that map shows what the Navy has got to do. Mr. Brassey, in his lecture, passed away from our home ports to others, which are really of very little less importance to us; namely, the colonial ports. And, therefore, I merely wished to remark that I trust that any scheme having for its object the strengthening of our naval force, whether it be offensive or defensive, whether for action on the open sea, or for the defence of our harbours, may never be limited to the few ports of the United Kingdom.

With regard to the remark which fell from Captain Willes respecting the Officers, and with regard to the speech of the Secretary to the Admiralty (in reply to Mr. Brassey's very able speech upon Naval Reserves), in which he spoke about the

difficulty there was in educating seamen, because there was no room on board ships for them, I wish to make just one remark. Captain Willes said, the difficulty was, that you do not know how to employ your Officers in time of peace, and the difficulty that the Secretary to the Admiralty pointed out was that there was no room on board ship for them. Now, of course, one is very apt to get off a subject on to one's hobby; but I totally deny that that is a state of things which it is necessary should exist, or that it is a system which will last. You are paying 150,000*l.* a-year for the half-pay of Naval Officers whom you cannot employ, because there is no room for them on board ship. You are also, and I beg particularly to draw the lecturer's attention to this before the question of amateur Officers is taken up at all, you are also paying 150,000*l.* a-year to another class of Officers (Marines), whom you are putting on board ship and educating for the purpose of being put on board ship, and when you put them on board ship, you cannot employ them; you have nothing for them to do. Consequently, you are blocking up your ships, which ought to be training schools for all the men and Officers that you should employ. You are blocking up and are filling every place with men, who could be more useful elsewhere. I speak with regard to the Marine force, that is the Marine Artillery and the Infantry. You will find my words are quite correct, that while you are complaining that you have not room on board your ships for educating your seamen, you are filling your sea-going ships with a large proportion of men who never can be seamen —whom it is never intended should be seamen—and whose services are more wanted elsewhere. The same remark will apply to the Officers.

Mr. STIRLING LACON: May I be allowed, Sir, to offer one or two observations, and I do so with great diffidence in your presence. One great advantage of this Institution is that persons who are not connected with either Service are enabled to express their views, and therefore opinions may be obtained upon the different questions that are raised here from other than a professional or an official point of view. This question of the Naval Reserves has been exhaustively treated in this Institution on a former occasion by Captain Gardiner, from which time I took a very great interest in it, and the subject has never been mooted in the House of Commons without my making a point of being there to hear it discussed. One thing that has astonished me very much has been this; that while the Report of the Committee of 1860 stated that there never would be a solution of this question without an harmonious action between the Navy and the Merchant Service, I have, every time that I have been in the House of Commons, found the First Lord of the Admiralty on one side of the House, and Mr. Graves representing the opinion of the Merchant Service on the other side at variance, and that there has been as much hostility and antagonism upon this question, as though the Navy and the Mercantile Marine belonged to two rival nations, the Minister stating that it is not the duty of the Government in any way to provide sailors for the Mercantile Marine. What did I gather on the different occasions when I had the privilege of being present in the House of Commons? That the Navy are educating the raw material at a cost of 60*l.* per boy, and Mr. Graves on the other hand stating that boys are brought up in the training ships for the Merchant Service at a cost of 19*l.* per boy. I will mention the reason presently why this great cost has been incurred by the Navy, but I think I have the authority of Sir Rodney Mundy for saying that the raw material which you are now raising for the Navy, although it was necessary to adopt independent means for the Navy 20 years ago, is too expensive and too good at the present time. We know that men cannot become sailors unless they go to sea at a very early age, and we know also that in the Merchant Service no person can get to sea now-a-days unless he can pull and haul. The qualification for the Naval Reserve is that a man shall have been five years at sea; but being five years at sea no more makes a man a sailor than a donkey standing in a stable for five years will make him a horse. What do you do with these men when you have enlisted them in the Reserve? Why, you give them 6*l.* retaining money and 4*l.* training money every year, and this goes on year after year until they are eligible for a pension. Now, I hope we may not go to war for many years to come, but if we should, then all this expense will have been incurred without corresponding advantage to the country. What has Mr. Goschen said in the House of Commons with regard to the question of pensions? He said that the question of pensions was a most important

and a most serious one; that it was an accumulating evil, and one that demands the serious consideration of the House and of the country. He promised to lay a statement as to this accumulative burden of pensions before Parliament, but I am not aware that such promise has ever been realized. Now we will go back 20 years to the time when the navigation laws were repealed and free trade came into operation and the apprenticeship system was abolished. This latter was done in spite of very strong representations that were made at the time to the Government. I believe Mr. Labouchere was the Minister. Many of the Mercantile Marine thought it a most suicidal act, but the Government which had carried the questions of the repeal of the navigation laws and of free trade, could not say to the shipowners "you shall carry apprentices," although I believe a boy on board a ship ought to be looked upon as necessary a part of the ship as a mainmast or an anchor. An apprentice law, to be of any service to the country, must be a compulsory apprentice law; it must be obligatory upon all, for if it is made obligatory on all it would be no hardship on any one, because all would be served alike, and the same argument would apply as to the competition with foreigners, because foreigners are obliged equally to bring up their own boys. But since we have abolished the apprentice law, the boys of this country, who would take to the sea like ducks to the water, have not been able to get to sea at all. When Captain Gardiner read his paper, the sense of a great number of persons of different classes in Liverpool and elsewhere had been taken with regard to this question; and at that time, four years ago, I believe 60 per cent. of the persons whose opinions were asked, were in favour of an apprentice law, and 40 per cent. were in favour of training ships; all thinking that something must be done. Since then four years have elapsed, and events progress very fast. In the face of the loss of the "Atlantic," and what is every day happening, the supply of seamen is no longer a question exclusively for the shipowners and the Navy, but it is also a question for the public, and I believe the public will demand that independently of the question of the reserves and the defence of the country, some measures shall be taken with regard to the supply of seamen for the Merchant Service. I do not believe we shall have such a sentiment from the Government again, as that the Government have nothing to do with providing sailors for the country because merchant ships are the ships in which in these days of locomotion almost every one of us, at some time or other, is obliged to travel. The Royal Commission may decide what is proper and what is not proper as regards building. They may decide what is proper and what is not proper as regards loading, and what is proper and what is not proper as regards manning, but they cannot provide sailors, for sailors take some years to make. Four years ago I thought it would be desirable to subsidize the Merchant Service in order to get back the system of apprenticeship, but I believe now the whole of the Merchant Service are in favour of an apprentice law. If that be so, see how that simplifies this question of the Reserve; after a boy has served five years in the Merchant Service he might serve two years in a training ship connected with the Navy where he would learn habits of discipline and obedience—and a few of such men in each Merchant Ship would act favorably upon the rest of the crew. The Navy might take as many as they required for their own purpose, and the rest might go and earn their livelihood for the remainder of their days in the Merchant Service without the necessity for pensions, or further expense to the country. By this means you would have a large body of trained men*—all trained—under the age of 20 who would come forward at war wages, and serve their country if they were required.

Vice-Admiral the Hon. CHARLES ELLIOT: There have been some depreciatory remarks made upon the Naval Reserve; and having had three years' inspection of great part of it, it is right to give my own experience on the subject. In the first instance, when the force was first established, they probably enlisted them rather unscrupulously, and there were probably a good many men who were not seamen.

* Nelson asked for 120,000 men. Mr. Brassey puts the reserves at 10,000 men, and Admiral Tarleton at 6,000 men. If the same man is returned on the strength both of the Militia and the Royal Naval Reserve—it is but reasonably to ask whether in the event of war, he will be looked upon as a soldier, or a sailor.—W.S.L.

The force was got up rather too quickly. But latterly—I should say from my own experience—the reverse has been rather the case—that they have been rather over-strict. I had three years' inspection of a number of men, those that happened to be in drill at the time along all the east and part of the west coast, and those that I saw, were remarkably fine men, and as far as discipline was concerned—we cannot say what they might be on board ship—they appeared perfectly disciplined. I only found one exception where things were not very well done. With regard to their standard, I may mention one circumstance, that we were so particular as to the standard of height, for the men that we entered from the Merchant Service, that the minimum of our height was above the average height of the whole of our seamen brought up from picked boys. They were remarkably tall fine men. I may also say, with regard to the Coast Volunteers, they are very fine men. They are of a different class, and, with different treatment, I think, we might have most useful men from the very men who have been in our Coast Volunteers, but the treatment is not satisfactory.

Captain GOODENOUGH, R.N.: My object in rising is to give a short statement of the numbers of men in the Naval Reserves of other countries, and I shall not violate confidence or state a word that is not in printed or published papers when I give a short sketch of them. As we all know, the most complete and most interesting Naval Reserve which exists in Europe, is that of France which has now existed some 250 years, has always been progressive, and as to whose discipline there has never been a single hitch or doubt. The numbers under that Naval Reserve Act of France are at this moment about 172,000 men,—that includes all the men of all ages, from 18 to 50. I do not mean to say that the whole of these men are efficient, but we may get some idea of the number of efficient men when we know that for some years past there have been about 15,000 men afloat, and about 7,000 men in reserve in barracks, and that you may say that there are in reserve double the number of drilled men that are on actual pay, making a total of about 65,000 or 66,000 men between the ages of 20 and 36. They are not all born seamen, but the great majority are brought up to the sea from the age of 14 or 15—fishermen, and men who have been to sea in various capacities. Some 4,000 every year are drafted to the French Navy from the conscription of the Army. Those men are specially drilled to the exercise of small Arms. A fair number of these afterwards enter the *Inscription Maritime*, which confers very great advantages on all who consent to join it, and who reside at naval ports. I should be quite unable to enter into the conditions of the French Naval Reserve Act, but it is to be found in the French printed regulations, and is of the utmost interest. At all times in the history of the English Navy those who have sought to work out some registration of British seamen have been those who have had some experience of the French service, beginning with Lieutenant St. Lo, who was in prison in France and who when he returned to England made his remarks in a pamphlet on the registration of seamen, entirely derived from the French system.

There are about 80,000 seafaring men in North Germany. Those seafearing men are described as being not merely foreign going seamen but as fishermen and also men who work about the docks and harbours. No large proportion of those men have passed through the naval service, but some 3,000 have been enrolled for some time past, and, at the present moment there are some 5,000 serving. You may always say when you speak of any German force, that the force enrolled under their organic law, has twice the number of its representatives in reserve; so that if there have been 5,000 enrolled in the German Navy there are 15,000 men, if all reserves are called out, without calling up the *See-wehr* or *See-sturm*.

In Austria very much the same number of men and very much the same law exists. In Italy something of a similar law exists, but there it does not suit so well, because they have an immense maritime population. In Austria and Germany it does suit the population: their system of compulsory service taking in every class. But in Italy it does not suit it the least in the world. They have a maritime population of 225.000, chiefly fishermen, but of whom a great number man those Genoese barques of which so many are employed in the carrying trade, and some few steamers trading to all parts of the world. The Italian law states that the seamen are divided into classes, each class being composed of men who reach the age of 18,

during a single year. As there are a very large number of men, the Navy enrols only, say, one-fifth of a class, but when the Reserves are called up for actual service, the law obliges the Government to take the whole of the class; therefore it has for every drilled man, to take four undrilled men before it can touch the men of the other classes. I mention this to show, that an organic law for the compulsory service of seamen does not suit all countries; it suits admirably a small maritime population, but it is not adapted to a large maritime population. The French system is the one which alone, as far as I know, suits every class in France admirably, for there their Navy is largely in excess of the protection required by their Merchant Service.

Reverting to Mr. Brassey's excellent paper, I think the most valuable suggestion which he has made, and the one most likely to bear fruit is, that with reference to an Inspector-in-chief of the Naval Reserve. Wherever that idea had its birth, and it has now been spoken of largely for some time, this is the first place in which it has had public expression, unless my memory fails me, and Mr. Brassey may have already spoken of it in the House of Commons. I think that from the date of the appointment of an Inspector-in-chief of Naval Reserves, you may expect to see first of all the exact facts publicly reported and spoken of as to the condition of Naval Reserves, then an exact comparison between the men in one part of the country and in another, and finally the exact wants of the Naval Reserve made known as to Officers. (Mr. BRASSEY: The comparison between year and year.) And also the comparison between year and year. There are many other points I should like to touch upon, but as the hour is so late I will merely advert to one, viz., as to the numbers of men who are likely to be required, and I think the speakers generally have seemed rather satisfied with the present number of men whom we can call upon for foreign service. I am by no means so: I look upon 10,000 men as a very small flea-bite, particularly when you consider that that is not a number that you will be able to lay your hand on at once. You will probably be able to lay your hand immediately on 2,000, and within a little time afterwards on another thousand. (A VISITOR: You will get them abroad.) But perhaps they will not be at places where your ships are, so that I look upon that as a very small flea-bite. During the war between France and Germany the largest number of men the French had called out at any one time, was over 72,000; it is true that a large number of those were on shore, but that does not afford any argument, and if we look at the commencement of a war we see the immense advantage which a large Reserve gives. The French were able (although they did not use it) within 21 days, to fit out a fleet of 10 or 11 ironclads and to have them ready to send to the Baltic. Everybody knows we could not do that. A point on which Mr. Brassey asked for our opinion, is that of the condition of merchant seamen. I am sorry to say I am not in a position to judge of the comparative aptitude and comparative worth of our merchant seamen at the present day; but I take it that it is a case something like that of the horses which has been spoken of without due knowledge, and that there exist at the present moment as large a number of good English seamen as there ever existed, but that the number has not kept pace with the wants of the Merchant Service, it has not kept pace with the rapid increase of our Mercantile Marine. For instance Mr. Brassey said that some 8,000 prime men are employed in yachts; that is a very much larger number of men than were ever employed in former years, and a great number of those men who are the very best seamen, have been withdrawn from the Merchant Service. (Mr. BRASSEY: Temporarily.) For an increasing time every year; for I observe that yachts are fitted out earlier and sail later every year. The whole question of this training of merchant seamen is a question very closely bound up with that of technical training in other trades and professions. We heard a great deal a few years ago about the great want of technical training in all trades and professions. The trade of seamen is essentially one which requires technical training. In former years, where each ship had a large complement compared to what she has now, and where there was a large proportion of boys entered, the training of boys for their profession as seamen went on insensibly. Shippers got men as they wanted them, and therefore people did not care to inquire how they got them. But at the present day nobody wants boys; they cannot be economically employed as hands, and therefore it is absolutely necessary that we should have a system of technical training which will prepare lads for their work as men afloat. Whether they are to get that tech-

nical training by the combination of merchants and local boards to found schools, or whether they are to get it by the assistance of the State, I do not pretend to say, but there is no doubt the State must interest itself in the matter; and one way in which it can do so is, by compelling the proper manning of merchant ships. We know that a great many are exceedingly ill manned, and we frequently hear of ships being manned by men of different countries, who cannot understand each other. That is a matter in which the State can interfere by declaring that the ship shall be efficiently manned, and that the crew shall be inspected by a proper person before the ship goes to sea. That again would compel the local authorities and local boards to institute a system of training under which men could be brought up, so that ships might not be stopped by an officer of the central Government from proceeding to sea for want of men. There are three classes of Reserve of which Mr. Brassey has spoken, and when speaking of those for coast defence, I must say I have always thought fishermen and that class of men could be made most useful. We should want to defend our coast, not so much by guns probably, although there we should require a certain number of men, but to a larger extent by obstructions and torpedoes, and in that case we should at once have to fall back on the assistance of fishermen, who know the set of the tides, the creeks and estuaries, and are perfect hands in the management of boats. I must say I regret very much indeed that, in consequence of the better state of preparation of the Engineer Officers and men, for the questions of the day continually submitted to them, the defence of the coast of this country has fallen into the hands of the Engineers. It ought to have fallen into the hands of the Navy, but simply from the want of preparation of Naval Officers in those technical trifles, such as the use of electric torpedoes, the whole thing has fallen into the hands of Engineers instead of into naval hands. In Germany, where they have studied this point very closely, because they look upon their defence in a future war as being almost mainly confined to the defence of their coast; they had before their war with France a sort of combined corps. There also the Navy was not duly prepared; they had no Naval Officers who had the amount of technical knowledge to enable them to lay down and fight with torpedoes, and therefore they were obliged to have a certain number of Engineer Officers, to whom they attached a number of seamen, with Naval Officers to command them, who worked under them and carried out a certain number of experiments. At the conclusion of the war the whole thing was altered. They had then found out that the grand difficulty in torpedo warfare and coast defence by torpedoes and obstructions, was the management of boats; no amount of technical knowledge of torpedoes could enable sappers or Engineer Officers to manage boats; only a seaman's experience was of any good there. Therefore they altered their whole system, and at this moment the defence of the coast of Germany is confided to a Torpedo-Abtheilung of the Naval Reserve, which numbers 300 men, always employed, and about 1,000 men when the Reserves are called up. Therefore I think that portion of our Naval Reserve could be very well employed in this manner.

Rear-Admiral Lord FREDERICK KERR: With reference to one force which has been spoken of, viz., the Naval Coast Volunteers, I am convinced, as far as my experience of them for some years goes, that they are the worst stick the country ever attempted to lean upon. When a reserve of the Navy was talked about a great effort was made to enrol the fishermen and that class of men. Men living anywhere near the coast—and they were not very strictly confined to that—were enrolled in that corps, and at the time I got the command of a division of them, there certainly was not a sailor amongst the hundreds of men in that corps; they were chiefly miners, and that class of men who if you put them in a boat, and sent them across Milford Haven would have been sea sick. From the urgency which was used to make the corps complete, and to get up the numbers, the question of efficiency was totally disregarded, and the country paid for that corps when they were not of the slightest use, in fact they were worse than no use because they were held out as something ge[illegible] when they were utterly useless. They were amphibious animals to a certain extent, but they were not sea-going, for on one occasion I remember a man being claimed by three Militia regiments, besides the corps in which he served as a volunteer; he arranged the time so that he went from one to the other and received his four bounties and four rates of pay. There was another man who recommended himself as having lived on

the water all his life. I found out that his father kept a mill and that the water ran under the house, so he said he had lived on the water all his life. I believe in Scotland it is better done, and if the Officers in England had been sufficiently resolute in the first instance to withstand the pressure, when the pressure was put upon them, the result would have been different. You know that some Officers will give way when an external pressure is brought to bear upon them, if they see they are carrying out the wishes of their superiors, although the strict letter of the law may be against them. I should be very sorry for Mr. Brassey to go away without having some little "*pat on the back*" with regard to the corps as to which he has taken so very much trouble, and which I had the pleasure of seeing drilled the other day. As far as the efficiency went, it was extraordinary, and considering the very short amount of drill that they have had, I think their efficiency must be put down to the superior intelligence of the men in the force. They came to their work determined to do it in a voluntary spirit, and they have reached an efficiency which is very encouraging and very satisfactory. I suspect the numbers of that corps would never be very large, but being a purely Volunteer Corps they deserve encouragement of every sort, and I am sure if they choose to give their time and efficiency for the service of the country, free of expense, nobody can blame them. We might go a little further. When the Volunteers were instituted, the object was to carry out such operations as have been mentioned—not only coast defence and the manning of forts—but that gunboats should be manned and small vessels, so that the country might be made a sort of wasp's nest with small vessels round the coast manned by our fishermen in times of war. These are the sort of men you want—not miners. With regard to the men Mr. Brassey has taken so very much interest in, I mentioned to him the other day, that there are men anxious to join a corps of the same sort. The present one is an elective corps, but I have had applications from men who have served for years in the Navy, who, after having gone through their apprenticeship, and learned that most essential portion of it—discipline on service (somebody suggested teaching discipline afterwards, but I say rather of the two, teach them discipline first and drill afterwards); these men are anxious to join a Naval Coast Defence Corps to be placed on the same footing as the Volunteers on shore—that is, merely to have their drill, and Army accoutrements, and the same capitation grant given to them. My informants said they knew hundreds of men in London who would be willing to join such a corps, and who were very anxious to do it. If the Government, however, say that they have reserves enough, the thing is at an end; but should they want more, there are a number of such men who will, if you give them the same encouragement that you give to the shore Volunteers, come forward and form a small but efficient force to assist you in defending the country.

Lieutenant CRAUFURD: Captain Willes mentioned the Reserve and the retired Officers, and said, that they might possibly be called out. Now, Sir, I wish to plead that some opportunity should be given to them for preserving their qualifications, either by allowing them to go for a cruise in the first Reserve or Coast Guard ships, or in some way to keep up their professional qualifications. I think a great many young Officers, who have retired from private motives, would be very glad to keep up their professional qualifications, and do what they could in time of necessity.*

Mr. BRASSEY: I have but few words to say in reply. Indeed at this time of night it would be most improper that we should prolong the proceedings. With regard to the point on which I was very anxious to have the opinions of Naval Officers, namely, as to whether or not the Reserve we at present have, is sufficient, I have heard, with the deepest interest, the opinions given to us by Captain Willes, Captain Goodenough, Captain Colomb, and other Officers, and I take it that I must accept it as the opinion of all those Officers that our present Reserve of 12,000 seamen, is scarcely adequate to meet the demands of a naval war. If that be the fair representation of the state of opinion in the Navy, then I arrive at the conclusion that there is a good ground for recommending the adoption

* There are nearly 80 retired Lieutenants under 10 years' seniority, might not a large proportion of these Officers be willing to devote some time to keeping up their professional qualifications in case the country should require their services on an emergency?

of some of those suggestions which were made by the Commission of 1859, with a view of assisting in the training of seamen to serve in time of peace in the Mercantile Marine, but who were to be available for the Naval Service in time of war. I have, on various occasions, endeavoured to promote the adoption of those means, but those whose duty it has been to defend the policy of the Admiralty, have asserted that there was no necessity for a larger Reserve than we have at present. But if I mayventure to proceed, on some future occasion, confident in the belief that it is desirable to have a larger Reserve, I shall have a basis of operations which will give me a greater opportunity of promoting those measures which have been recommended by the Royal Commission. With regard to the number of Officers, if the system of half-pay, under which we undoubtedly have a great number of Naval Officers in reserve, is not in itself objectionable, then, I think we may dismiss from our minds any feeling of anxiety as to the reserve of Officers. The present system does, undoubtedly, furnish a great number of Officers, but a large number of gallant gentlemen are necessarily on half-pay. Then with regard to the Coast Volunteers. I have been taken to task very severely, for saying that there had been a certain laxity in the enrolment of unfit persons in that force. But I find from the opinions expressed this evening that I had not made a very great mistake. I am glad to find gallant Officers think that in our fishing population which is very numerous, there are elements of strength for the country in the hour of need; and I am quite sure that if the proper means be taken, the fishermen could be induced to join the Reserve. They are, no doubt, a slow and somewhat suspicious body. I take it if you wanted to attract a large number of those fine hardy Scotch fishermen into the Navy, it would be a very imprudent thing to send an Officer born in Hampshire to enlist them. A good Scotch name would be capital introduction to the fishermen of Scotland. They are a class of men whose confidence is not very easily won; but I do not despair of being able to attract the fishermen to join the Coast Volunteers. I am very grateful to the gallant Officers, for the kind terms in which they have spoken of my lecture, and I shall always take the deepest interest in the Royal Navy.

The CHAIRMAN: I am sure you will all wish me to return our cordial thanks to Mr. Brassey for the interesting lecture he has given us to-night, and for the great interest he has taken in this subject. There are one or two remarks I should like to make, without following him through the whole of his lecture, more especially as Captain Colomb has taken the wind out of my sails, and has anticipated me in a good deal of what I should have said. With regard, first of all, to the Officers, I find that there are at the present moment 278 Officers of the Royal Naval Reserve on our Navy List. Striking off 78 of these as Officers, who are honorary or disabled by age, and who might not be prepared to come forward, yet 200 of these would, I think, be exceedingly valuable for manning our improvised men-of-war (such as the Peninsular and Oriental line of steamers), with a gun mounted for the protection of commerce, and also in commanding transports. Last year, the Admiralty obtained an Order in Council for the enrolment of 200 midshipmen for the Royal Naval Reserve, to be taken from the "Worcester" and the "Conway." These young gentlemen are very much socially of the same status as ourselves; of good education; and no doubt they will be a very valuable supplement to the Officers of the Navy. Then, with regard to the Royal Naval Reserve itself, I had to go into the figures, a short time ago, on the Naval Estimates, and I found, taking our peace Navy at 19,000 blue jackets, we could maintain that force by the entry of about 3,000 boys, so that we are self-supporting as far as the peace Navy is concerned, and in the event of a war, we should then have to fall back on our reserves. We have, at this moment, something under 12,000 men in the Royal Naval Reserve. These are men who certainly are, whatever may be said by some speakers in this room, the *élite* of the mercantile marine. They are men who must have been five years at sea and one year an able seaman, and I appeal to Admiral Elliot and also to Admiral Keppel and Sir William Codrington, who have inspected the drill ships, to say whether they have not been surprised at the efficiency of these men at drill, and the ready way in which they manned the guns. I believe that they are reliable. I may estimate that the numbers that we shall be able to supplement the peace Navy by, would be 6,000, that is estimating that one half would be abroad, and those men with the Coast Guard. The Naval Pensioners and the remaining Coast Volunteers would man all

our ships with blue jackets that we could possibly provide for them, and there would be then 6,000 men in reserve. I do not mean to say the number of our ships ought not to be very much increased on the outbreak of hostilities, but we should have enough men to start with, and then other men of the Reserve coming home would form a further Reserve to fall back upon. With regard to the Coast Volunteers, and the strictures passed upon them, I certainly had recommended that they should be gradually let drop. As they were constituted, the Act of Parliament, in the first instance, ran, "seafaring men and others." That gave great latitude to the Officers who were very anxious to show as many as they could on their lists. In the next place, the Act ran that they were not to be taken more than 100 leagues from the land. The Duke of Somerset, when in office, had that altered, and they may be taken now any distance from the land; but, however, the class of men you wanted to enrol did not come forward. Those were the fishermen whom Mr. Brassey spoke of very rightly as being most valuable people for coast defence and the manning of gunboats; but these men would not give up their occupations to go on board ship, to live for 30 days amongst people of different habits to their own. Therefore, they do not come forward, and we have only got the longshore men such as Lord Frederic Kerr has described. I quite agree with Mr. Brassey that if we could organize the plan of having gunboats to go to the great fishing centres we should be able to obtain the services of these men, and with a drill of, say a week at a time, the men coming off in the morning and going ashore in the evening, you would be able to obtain as many men as you required to release your seamen for distant service, and to perform all the duties you would require on the coast and in the estuaries.

With regard to the Royal Naval Artillery Volunteers, I should like to say a few words. Mr. Brassey has taken great interest in the formation of this corps, and I think that they do deserve great praise and encouragement for the way in which they have thrown themselves into this movement. It is the first time that there has been any movement towards the Navy of a purely voluntary character. The Volunteers hitherto are all paid and well paid, but these men had given up their time, and at very great personal inconvenience have been on board the drill ship in the West India Docks, drilling through the winter in the evenings after their work has been over. I, myself, can testify that they showed very great proficiency in drill for the short time they were instructed, and the instructors tell me they never had people to instruct who showed so much intelligence or zeal in attempting to acquire a knowledge of the drill. The great difficulty with regard to them, if they are to be encouraged, is to give them facilities for training. Of course if, as Mr. Brassey says, he can obtain the formation at different ports, of different corps, it would be necessary to provide gunboats for their training, and I do not know exactly where the gunboats are to come from. I am afraid we should find it very difficult to assist them in that way.

With regard to the Reserves in the Colonies, it is true that there are a number of sea-faring men, fishermen, there, who would be available for their coast defence; but I think we may safely leave it to the Colonies themselves to protect their own hearths and homes. They would have power to legislate for themselves, and a little encouragement from this country, is all that they would require.

I will not detain you any longer, but will only say that these discussions are extremely valuable, because they are the only way of discovering our weak points, as the test of the efficiency of the Reserve can only be put in practice when the safety of the country is endangered.

LECTURE.

Friday, May 2nd, 1873.

GENERAL SIR WILLIAM J. CODRINGTON, G.C.B., &c., in the Chair.

THE AUSTRIAN ARMY.

By Lieutenant C. E. H. VINCENT, F.R.G.S., Royal Welsh Fusiliers.

IT is not without considerable diffidence, Mr. Chairman and Gentlemen, that I presume to come here this afternoon, humbly to bring to your notice the manner in which Austria has grappled with that most terrible problem of recent years—Army Reorganisation. I feel, too, that especial apology is due on account of the time. The morrow of the day on which that mighty empire inaugurates that which tends so potently to the promotion of peaceful industry and the development of inventive genius, would seem to be the date least fitted on which to bring under review her resources for war and the destruction of mankind.

This morning's telegrams inform us that the Reigning Chief of the Imperial House of Hapsburg, in company with the illustrious heir to the throne of England, opened little better than twenty-four hours since the International Exhibition of Arts and Industries at Vienna. Many, and I doubt not many of you, gentlemen, will seize the opportunity of visiting one of the most enchanting of European capitals. All will admire her palaces and her theatres; her promenades and her streets; her municipal institutions and her environs; and above all the country which has successfully brought all peoples, nations, and languages into one arena of commercial emulation and of social gathering. Not a few, however, there will be who, in witnessing all the pomp and luxury, all the riches and apparent prosperity around them, will think of the terrible trials Austria has passed through, and how, within the living memory of the youngest historical student, a hostile army held the fair city within its grasp. They will then turn their attention to the existing means to prevent the renewal of such a catastrophe. Let me, with your permission, endeavour to assist them in their investigations. But to you, gentlemen, I cannot give better advice than that you should yourselves become acquainted with the Austrian Army, that you should visit the Military Institutions, and the vast camp of Brück. You will not be unrewarded for your trouble;

for apart from the instruction and information derivable, you will meet with the rarest courtesy, the profusest hospitality and friendship. . .

Recent events have brought about such a fever of Army Reorganisation throughout the length and breadth of either hemisphere, that those who, a few years ago, were thoroughly versed in the military details of a country, now find themselves entirely at fault respecting the formation of its army. The subject, truly, has become in a manner distasteful and monotonous, but it is impossible not to feel some curiosity as to the manner in which the leading members of the world of nations have construed and applied the principles of modern military might, whose sole efficacy has been so terribly demonstrated. These principles emanated from the sagacity and forethought of two earnest representatives Scharnhorst and Gneisenau, of a country driven to the verge of ruin and despair by the continued victories of the enemy she has lately worsted in so unprecedented a manner. . . . .

In respect to Austria, the practical application of the study was no easy task, beset as she was with the germs of internal discontent, and resounding with the angry clamour of hostile factions. The military yoke had never been light, yet ill-success had continually attended the hardships and privations of the Army. The people were in little humour to suffer further encroachments on their liberty, and it was absolutely necessary to begin by pacifying the more or less just murmurings of the heterogeneous races composing the monarchy. How this was done in detail, little concerns the subject in hand, but it is known how the all-important loyalty of the Hungarians was secured by permitting them to crown and hail a King in the person of the Kaiser und König Franz Josef I, who granted them their long-wished-for separate Diet and Administration.

No time was now lost, and on the 4th of December, 1868, the Imperial signature was affixed to the retrospective law introducing the system of obligatory personal service for every male subject of the Austrian Crown.

To work out the details of the new system, Field Marshal Lieutenant Baron von Kühn, the then Minister of War, devoted himself with an indefatigable zeal, supported by talent of the highest order. But how difficult and tedious was the labour, how long it must remain apparently unproductive of result, is fully illustrated by the half century of uninterrupted peace and prosperity which the Northern Model required to develop the system and to arrive at perfection in its working.

Those of you who are, and I imagine there are few present who are not intimately acquainted with the organisation of the North German Army, may perhaps be astonished at Baron von Kühn's faithful adherence to that military prototype. This, however, is only on the surface of things, and it is hard for us to dive far below the surface, in the single hour to which the lecturer in this theatre is wisely confined. The admirably compiled and voluminous pages on the "Heerwesen der "K. K. Armée," will furnish ample material for novel investigation, and will show forth how many excellent provisions emanated solely from the Viennese Ministry. . . . . However I must plunge at once *in medias res*.

The Military Force of Austria is composed of—

The Standing Army,
The Reserve,
The Landwehr,
And the Landsturm.

The latter element, though, meaning simply a *levée en masse* of the entire male population for the last struggle in defence of hearth and home, having neither arms nor even theoretical organisation, exists but in name, even it is to be hoped to the most distant future.

The total liability to military (or naval) service extends over twelve years, commencing from the 1st of January of the year succeeding the 20th birthday to the termination of the 32nd year.

This period is thus apportioned—

3 years to the Standing Army,
7 „ „ Reserve,
2 „ „ Landwehr.
—
12

Service in the Landwehr is, however, variable; for, under certain social conditions, which I will presently enumerate, as well as the inhabitants of the three privileged communities of Trieste, Cattaro, and Ragusa (who, under the old system, were entirely free), individuals are permitted to fulfil the whole of their liability in that force, having received regular training with the Army for at least two months.

The effective numerical strength of the Standing Army, Reserve, and Landwehr, amounts to about 1,100,000 men, of which about $\frac{8}{11}$ths are contributed by the first two categories, the Standing Army and Reserve, to which Hungary furnishes a quota of nearly 330,000.

His Imperial, Royal, and Apostolic Majesty the Emperor Francis I, is at the supreme head of the Austrian Army, which he governs through the Ministry of War, and the Inspector-General, His Imperial Highness the Archduke Albrecht (the author of the celebrated pamphlet "Responsibility in War"), who is answerable for the military efficiency. The War Ministry is divided into three main sections—

The Personal,
The Military and Technical,
The Economical.

These are again subdivided into various departments.

A Chief of the Staff and five Inspectors-General of Artillery, of Engineers, of Cavalry, of Transport, and of Remounts, are appointed to assist the Minister.

The Chief of the Staff superintends the distribution of the Staff in all its practical and scientific departments, administers the Pioneer Regiment, and generally supervises all military education. . . .

Each of the other officers is responsible for his branch, and forms the organ of communication with the Government. He superintends all the technical military schools, and to him are made the confidential reports.

There are 292 officers employed in the War Ministry at Vienna, exclusive of permanent engineer, artillery, and transport committees. . . . .

The most perfect department, perhaps, in the Ministry, is that for the collection of military intelligence and information. It can hardly be far behind the Berlin General Stab in the extent of its researches. It is divided into four sections, viz.:—

1. For interior topography.
2. For external topography.
3. For matters connected with railways, steam-packets, and telegraphs.
4. For the collection of information concerning foreign armies.

The officers employed in these four sections are sought for throughout every branch of the standing army, reserve, and landwehr, and their appointment is governed by no pedantic laws of routine and precedent which limit the area of choice, and consequently detract from power and strength, where they are especially needed.

Austria, inclusive of Hungary, is divided into seventeen military districts, the head-quarters of which lie at—

1. Vienna, for Lower Austria (6 brigades of infantry, 1 of cavalry, and 1 local brigade).
2. Linz, for Upper Austria and Salzburg (1 brigade of infantry, 1 of cavalry).
3. Brünn, for Moravia and Silesia (2 brigades of infantry, 1 of cavalry).
4. Graz, for Steirermark, Kärnten, and Krain (2 brigades of infantry, 1 of cavalry).
5. Triest, for the town of Triest, Istria, Görz, and Gradiska (2 brigades of infantry).
6. Innsbruck, for the Tyrol and Vorarlberg (2 brigades of infantry).
7. Prague, for Bohemia (6 brigades of infantry, 2 of cavalry, and 1 local).
8. Lemberg, for the Eastern portion of Galicia (2 brigades of infantry, 2 of cavalry, and 1 local).
9. Krakau, for the Western portion of Galicia (2 brigades of infantry, 1 of cavalry).
10. Zara, for Dalmatia (2 brigades of infantry).
11. Pest Ofen (3 brigades of infantry, 3 of cavalry, and 1 local).
12. Presburg (2 brigades of infantry, 3 of cavalry).
13. Kaschau (2 brigades of infantry).
14. Temesvar (2 brigades of infantry, 3 of cavalry).
15. Hermannstadt (2 brigades of infantry, 1 of cavalry).
16. Peterwardein, for the military frontiers (2 brigades of frontier troops).
17. Agram, for the Croatian and Slavonian military frontiers (2 brigades of infantry, 2 of frontier troops).

At the head of each district is a General Officer, who is responsible for all the military administration of his command, which is divided into two distinct branches—

(1.) The purely military and technical.

(2.) The economical and control.

Every male subject of the Austrian Crown incurs, as I said before, the liability to military service. Exemption is only obtainable from physical deficiencies, in which case the exemptee has to pay a pecuniary indemnity to the Military Invalid Fund, and under the following social conditions, viz.:—

1. Being the only son and support of a helpless father or widowed mother.

2. After the death of a father, being the only grandson and support of an infirm grandfather or widowed grandmother.

3. Being the only support of helpless relations.

All service by a substitute, or exemption by purchase, is abolished. Those who have already got off by these means are for ever free; but for all others the law is retrospective, and service is required of them according to their age.

Certain social conditions further enable men to pass at once into the landwehr, having received two months' instruction in a regular regiment, viz.:—

Being the possessor of inherited property sufficiently extensive to support a family of five persons, and not larger than will maintain four such families.

Being a divinity student, a candidate for a professorship, or a national schoolmastership. . . . .

As in Prussia, the system of one year volunteers is in force, in order that the civil professions may not be deteriorated by the military exigencies. Youths of good character and education can qualify themselves in this manner for commissions in the reserve and landwehr, at the same time that they become freed from regular service in time of peace. The educational standard for the Einjährige Freiwillige is estimated by the passing of a special examination or the attainment of a certain place in the classes of a Government school. They are permitted to serve in the branch they select, whether it be combatant or non-combatant, with the regiment, and in the garrison also of their choice. The year may be any one of those between the 17th and 25th birthdays. At the termination of the year's training, which embraces all the duties of the various ranks, the volunteers are submitted to a searching theoretical and practical examination. Those that become reserve officers are liable to be called out for three trainings of not longer duration than four weeks each. At the proper age, the reserve officers pass into the landwehr. The expenses of the year's voluntary service fall entirely on the individual, even to quarters, except in a few isolated cases, when they are defrayed by the public, who in return demand higher qualifications, and evidence to show that the volunteer has no means of his own.

Ere I speak of the peculiarities of the several arms of the Austrian Army, it behoves me, gentlemen, first to direct your attention to the all important system of officering the whole. Austria does not find the same facility as Prussia, and happily ourselves, in procuring the best material for filling the commissioned ranks. It is a disagreeable, yet in-

controvertible fact, that the best blood which alone can lead plebeian ranks to victory, somewhat shirks a profession which bears the stigma, more by its misfortune than its fault of possessing "la routine de la défaite." Not all the deeds of signal valour which the Austrian Army adds each campaign to its gallant history, can thoroughly dissipate the keen sarcasm of the remark for which, I believe, a Hohenzollern Prince is answerable. Moreover, the severe mental and physical work and incessant examinations which the Austrian Government now exacts from her Officers, shakes off all but the most zealous.

In the standard of theoretical professional knowledge, Austria surpasses even Prussia. Practical tests, too, bar every stage of advancement.

The military schools are very numerous, and the education therein given is excellent. Cadets, who have been trained at the public cost, have to remain ten years in active service from the date of their exit from the academy, those who have paid half rates for seven years, and those who have paid full terms, for four years. . . . . But the preparation for a commission may be regimental instead of academical, and in this manner the path is open to any non-commissioned Officer of good character and antecedents, and of sufficient attainments. Many Austrian Officers—some might say too many—rise from the ranks. However, the regimental training is preferred to the academical by many, even of the most gentle blood. . . . .

After the aspirant has practically learnt every duty of the private and non-commissioned Officer, he attends the school which is established at the head-quarters of every division. Here he goes through a course of eleven months, followed by an examination. If this be successfully passed, he returns to the corps, and performs the duty of an Officer, though still uncommissioned. In course of time, when a vacancy occurs, and his proper turn has arrived, he receives his commission, subject to the unanimous approval of the Officers of the regiment as to his social worthiness. This consent of the Offizier Korps to receive their comrade elect, is never dispensed with except in the case of a cadet.

In spite, however, of this wholesome provision, the camaraderie for which our own and the Prussian Services are so remarkable, is somewhat wanting in default of the opportunities of social intercourse. The pay is too small to permit the establishment of messes, and few possess private resources. Besides this, the repeated transfer of Officers from one regiment and garrison to another on promotion, loosens friendships and lessens *esprit de corps*, which are such universally acknowledged elements of success.

Promotion goes right through the army, arm by arm, and rank by rank. It is by seniority and non-seniority. The former depends on the confidential reports giving clear testimony of the individual's efficiency. The latter method is followed every sixth step below field rank, and every fourth step above it. The candidates for non-seniority promotion are submitted to a very severe theoretical and practical test. These examinations are held biennially, and the successful competitors

are promoted in their numerical order on the final list. The expenses of candidates for non-seniority promotion are paid the first time of trial, but if they then fail, and obtain permission again to try their chance, they must defray them themselves.

This method of promotion would appear to merit some attention, for while it holds out a reward for the deserving and industrious, rapid advancement, by its means, can never be supposed to have connection with opportunity, interest, and protection. It must work equally fairly for the son of the Minister and for the promoted non-commissioned Officer.

Special qualifications, even if others are somewhat in defect, are always taken into account in considering the worthiness of a candidate.

For all purposes of promotion, cadets are counted as officers.

There is no special examination for promotion below field rank, but to pass from Captain to Major requires so vast a display of intellectual and military power, that many retire before so formidable an obstacle, thus clearing the way for true ability. Candidates for field rank must naturally be the Senior Captains of regiments. To prepare for the examination, it is optional with them to study for eleven months at the special school for each arm in Vienna. The practical test consists in being placed, suddenly and without previous warning, in charge of a force consisting of not less than three battalions of infantry, two squadrons of cavalry, and half a battery of artillery, with orders to carry out some general idea, given by the examining officer. The theoretical knowledge lies in all that appertains to military efficiency.

The minimum of time to be spent in a junior position before promotion is as follows:—

To Captain, four years as a subaltern.

To Major, four years as a Captain.

To Colonel, three years as a Field Officer.

After three years' service, aspirants to the Staff are allowed to enter the Staff College or Kriegs Schule. The course of study lasts two years, and comprises much the same subjects as are taught in other colleges of a like nature, but to the notable exclusion of mathematics in any shape or form. . . .

An Officer can leave the Standing Army at his own request after one year's service, but he must enter the Reserve or Landwehr, unless he has attained the limit of the 32nd year of age. . . . .

Foreigners are no longer admitted into the Austrian Service so freely as formerly. Now, they must obtain the formal authorization of their Governments, produce certificates as to character and probity, pass through every grade of the military hierarchy, and, like born Austrians, speak fluently one of the numerous dialects of the empire besides German, before they are eligible for promotion. At home, then, I take it they will find it more comfortable to act upon the trite saying, "Dulce et decorum est pro patriâ mori."

I have shown how easy it is to pass from the non-commissioned to the commissioned ranks, but the Austrian Government does not ignore

the necessity of having experienced and reliable "Unteroffiziere." A limited number are therefore permitted to re-engage with the consent of their Commanding Officers for a further period of service after the termination of the first three years. The re-engagement dates from the first of January, and is never for more than one year at a time. Every re-engaged non-commissioned Officer receives a daily addition of 15 kreutzers to his pay, and a gratuity of 60 florins at the end of the first year if he then takes his discharge; 120 at the end of the second; 190 florins after three extra years; 260 after four; and 1,260 florins, or £100, after twelve, besides the certainty of a comfortable and honourable, if not very lucrative, Government situation.

The Standing Army

must now be considered. It naturally forms the military training school of the country.

The tactical units are the division and the brigade. A division consists of two or three brigades. An infantry brigade is composed of two regiments of the Line and one of Rifles. A cavalry brigade is made up of two or three regiments, to which is usually attached a battalion of Rifles.

The Standing Army is divided into 24 divisions, consecutively numbered. The 21st, 22nd, and 23rd divisions are composed of Frontier troops.

These 24 divisions contain 71 brigades, 52 of infantry and 19 of cavalry. The brigades are usually known by the names of their Commanders. . . . . A Field-Marshal Lieutenant, corresponding to a Lieutenant-General, commands a division as a rule, and a Major-General a brigade.

The Infantry

of the Austrian Army possesses no Corps of Guards, except a small body of Gentlemen-at-Arms, who guard the person of the Sovereign, and are termed the Imperial and Royal Guards.

The infantry of the Line consists of 80 regiments, corresponding to the 80 recruiting districts into which the Austro-Hungarian Monarchy is divided. Each district has its regiment of infantry, of cavalry, and battery of artillery to supply.

The regiments are numbered from 1 to 80, and are known by their number and the name of their honorary proprietor.

A regiment is commanded by a Colonel or Lieutenant-Colonel. It consists of five field battalions of four companies each, and one reserve battalion of five companies.

The battalion is commanded by a Lieutenant-Colonel or Major. . . . . The companies of the field battalions are numbered consecutively from 1 to 20, those of the reserve battalion from 1 to 5.

The stations of the first three battalions of a regiment are those which are most suitable for the public service; those of the fourth and fifth battalions, of which the cadres only are maintained in time of peace, are invariably within the recruiting district for the purpose of

the periodical manœuvres of the reserve. The cadre of the reserve battalion is stationed at the head-quarter town of the district. To it are usually attached those persons who have to undergo eight weeks' training prior to enrolment in the Landwehr. . . . . The strength of a battalion on the peace footing is 14 Officers and 372 men; and of a regiment 89 Officers and 1,434 men.

A company on the peace-footing has three Officers and 95 non-commissioned Officers and men. . . . . The mobilisation of the Standing Army is effected by calling in the men on furlough and the reserve. The complement of Officers is likewise made up, and further by the commissioning of cadets if necessary.

A battalion on the war establishment numbers 18 Officers and 934 men; a regiment 133 Officers and 5,935 men, of whom 17 Officers and 350 men are non-combatant. . . . . A company on the war strength, is composed of 4 Officers and 236 non-commissioned Officers and men, to it then are further added four pioneers, and three bearers of the wounded. . . . . The rifle troops consist of one rifle regiment and 33 independent field battalions. The Tyrolese riflemen, whose fame has endured through long ages, are organised in seven battalions of four companies each, seven reserve companies, and one additional battalion, the cadre only of which is maintained in time of peace.

The Austrian infantry is now armed with the "Werndl" breech-loading rifle, a somewhat heavy weapon and clumsy to the eye, though very formidable in competent hands. The ammunition pouches of the privates contain 72 rounds; of the non-commissioned Officers 24. . . . . There was a time when the smart white tunics of the Austrian infantry were well known in every *salon* in Europe, and the human masses of snowy white captivated foreign critics no less than they offered a fatal mark for hostile bullets in the field. Now, however, the white has been superseded by a bluish-grey, and belts of untanned leather have taken the place of pipeclayed straps. Hungarian regiments are still allowed to wear their peculiar close-fitting blue pantaloon terminating in the boot.

Far be it from me to say that Austria has gone too far in her honest desire to sacrifice effect to utility, but I have heard men of experience and observation remark in Vienna, that the slouching gait of the sentries, and their ill-worn uniform, shows that a new feeling of disregard of personal appearance has sprung up in the Army. One of the most illustrious of contemporary celebrities, who, now alas, lies asleep in a temporary resting place not many miles from this Institution, publicly warned armies against the fostering of so pernicious a feeling from the palace-prison to which he had been chiefly driven by the excessive encouragement of it, and its concomitant evils. Yet the danger may only lie in the limit imposed, rather than in the feeling itself, for there could be no more unsoldierlike sight to our insular eyes than the Prussian Guardsman rolling backwards and forwards on sentry go, and steadily ignoring such a thing as the manual exercise in the manipulation of his rifle; yet what finer troops could there be in the field?

The Cavalry

of Austria, and yet more so of Hungary, is world-renowned. Aye, gentlemen, many a square has been broken, many an advance covered, many a retreat gloriously defended, by those splendid horsemen. Although it is stated that they have lost something of their old prestige, have fallen somewhat from their pinnacle of perfection since the change in the war functions of that arm, we may be sure that many an additional proof of valour will be shown by them to any future enemies of his Imperial Majesty.

The cavalry of the Austrian Army consists of 41 regiments, whereof 14 are Dragoons, 14 Hussars, and 13 Lancers.

Each regiment is composed of six field squadrons, numbered 1 to 6, one depôt squadron for the training of recruits and remounts, and one reserve squadron.

Three squadrons form a regimental division or wing.

The strength of a squadron on the peace footing, is 5 Officers, 1 Officer's substitute, and 130 non-commissioned Officers and men, whereof 16 are dismounted; on the war establishment, 165 non-commissioned Officers and men, of which 20 are dismounted. . . . A cavalry regiment takes the field with about 30 Officers and 870 sabres. The reserve squadron is usually detached for escort and orderly duty, the protection of baggage, &c., by which means the six field squadrons are kept together.

The total combatant strength of the Austrian cavalry is about 36,000 men, armed with the sabre, a breech-loading carbine and pistol, and the lancers with a lance. The pouches contain 30 carbine and 15 pistol rounds.

The training of the Austrian cavalry is now based upon the latest and most approved principles. Outpost and reconnaissance duties are ceaselessly studied.

Each regiment draws its recruits, who are selected for their previous association with horses, from the one or two infantry recruiting districts to which it is assigned. The preliminary training of recruits begins in the autumn at the depôt squadron, from whence in the spring they are drafted to the field squadrons.

Re-engagement year by year is considerably encouraged in the cavalry, but the number of re-engaged men must not exceed 90 per regiment.

But, gentlemen, at the present juncture, when such earnest attention is being directed to the supposed failing supply of horses in this kingdom, and serious apprehensions enter into the most non-alarmist minds of the difficulty that would be experienced in meeting any extensive demand either for offensive or defensive purposes, I venture to think you will feel more interest in the remounting, than in the recruiting system of the Austrian cavalry. I will, therefore, pass on to it at once, although a new law on the subject is at present under discussion at Vienna.

I cannot, however, omit first to direct your notice to a very admirable institution in the Austrian cavalry. The mounted arms are now pushed

so far in advance of the main force, that it is above all things desirable for them to possess in themselves all the mechanical skill they may chance to require. For this purpose, the fourth section of the sixth squadron of regiments is composed of artisans, who, besides their regular training, are especially instructed in practical engineering, in the laying and repairing of communications, and more particularly of railroads.

The remounts are supplied in part from the Government breeding establishments, of which there exist no less than twelve, and in part by the purchase of the horses at a predefined price, which have been bred therein and sold to agriculturists and others, on the understanding of the call that may possibly be made upon them. It is well known what excellent English blood has passed into these Austrian haras, and it is, indeed, high time to impose some restraint on foreign countries profiting so much more than ourselves by British equine resources. . . . . After the remounts for the current year have been furnished, the residue four-year-old stock is, I believe, sold by public auction. No cavalry regiment is suffered to remount more than 12 per cent. per annum of the mounted men. The remounts are distributed so that two-fifths of the horses are from 14·3 to 15·1 high, and three-fifths 15·2 and 3, or over.

Subaltern officers are mounted at the public cost. Staff Officers, Captains, and one year volunteers have to provide their own horses.

The Artillery

is the arm we will now briefly consider. Its splendid history you cannot ignore, and its skilful handling and glorious devotion on the fatal day of Königgrätz, will still be fresh in your minds.

The Austrian artillery consists of twelve regiments of field, and twelve battalions of garrison artillery. The former are designated by their consecutive numbers, and the names of their proprietors. The latter simply by their numbers. . . . . A field artillery regiment is commanded by a Colonel, and consists of—

4 four-pounder foot batteries.
3 „ horse batteries.
5 eight-pounder foot batteries.
The cadre of a depôt battery, and
The cadres of five ammunition columns.

In war, a thirteenth battery can be added to the regiment, and the calling-in of the men on furlough and in the reserve, brings the batteries up to their full strength, *i.e.*, from the aggregate total per regiment of 75 officers, 1,415 men, and 532 horses, to 97 officers, 3,558 men, and 2,795 horses. In time of peace, the batteries are distributed throughout the monarchy, in the manner most beneficial to the public service. In the field, each *corps d'armée* of three divisions of infantry is allotted—

4 four-pounder foot batteries.
2 „ horse „
6 eight-pounder foot „

Together with the first four of the artillery train columns of a regiment.

A cavalry division has two four-pounder horse batteries attached to it.

A battalion of garrison artillery consists of the battalion staff and six companies. To the 9th battalion of garrison artillery three mountain batteries and (likewise one each to the 11th and 12th battalions) are attached . . . . The artillery recruits are obtained in the same way as those for the infantry and cavalry, from specially assigned recruiting districts. They are generally those of a superior intellectual class. Mountain batteries seek men who are inhabitants of hilly districts.

The horses are furnished by the remount establishments in the proportion of one-third 15·3 high and over, one-third 15·2, and one-third 15·1.

The Engineers

of the Austrian Army consist of two regiments of five battalions each, with four active and eight reserve companies, and one depôt battalion of five companies. There are, consequently, 25 companies in each regiment, which, commanded by a Colonel, has in peace a complement of—

118 officers and 2,736 men.

The Transport Service

of the Austrian Army is conducted by the Military Transport Corps, which consists of 36 field squadrons, 22 of which on mobilisation are assigned to the infantry divisions, five to the cavalry, four to army corps head-quarters, and two to general head-quarters.

The strength of the several squadrons varies, according to the nature of its duties, from 260 to 360 officers and men, with from 330 to 430 horses, and about 100 waggons and carts.

This system of transport appears to be less calculated to attain that great desideratum of having the baggage well up with the troops, which is achieved by the Russian and now by our own regimental methods.

The Hospital Corps

consists of 23 divisions. Their duties are solely in the hospitals; that all-important duty of bearing the wounded from the field being performed regimentally by trained men.

Time will not permit me to make additional demands on your patience by referring to the detailed organization of the reserve and landwehr. The former is subjected to periodical trainings, not exceeding three of four weeks each, in the course of its seven years' service. The minute the word goes forth for mobilisation,—should such unhappily become necessary,—it will be united with the Standing Army. The landwehr has no annual training, but in that force, where youths and veterans meet, the field army has a powerful support in numbers, no less than in quality.

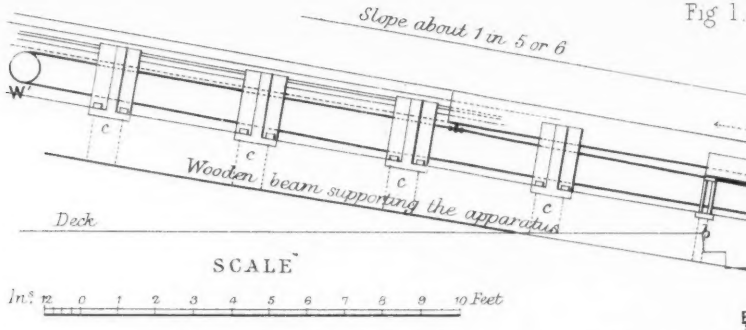


Fig 1.

SCALE

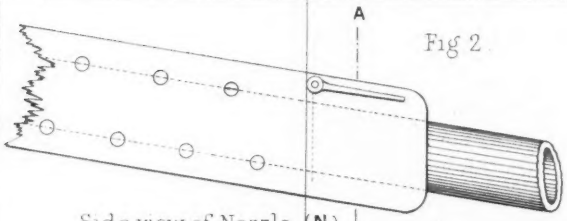


Fig 2.

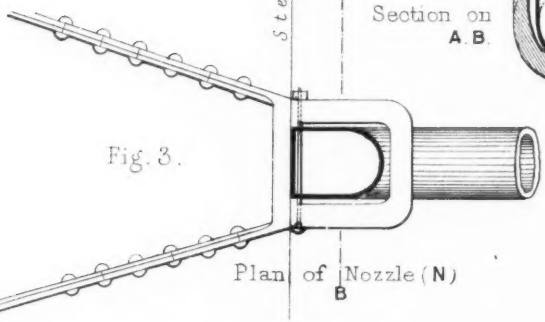
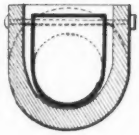


Fig. 3.



Section on A.B.

Fig 5.

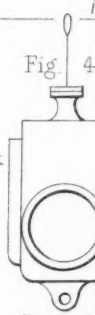
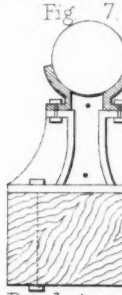


Fig 4.

Fig 6.

Section on

Fig 7.



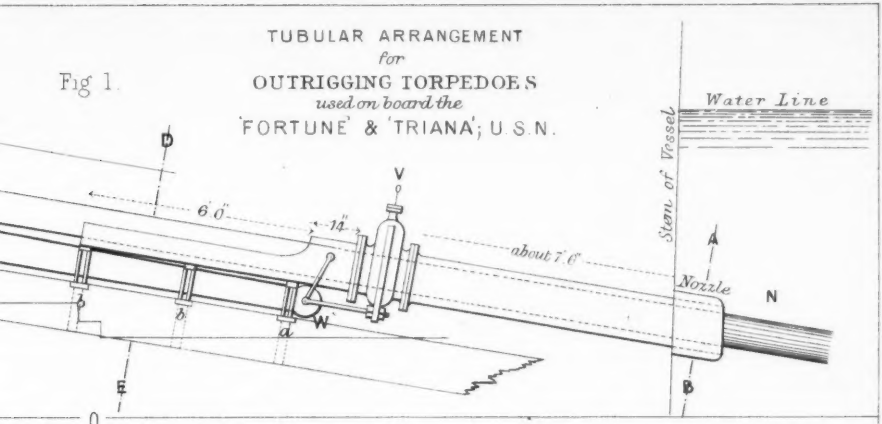
Brackets a

(dots denote pos
of wire rope

SCALE.

TUBULAR ARRANGEMENT
for
OUTRIGGING TORPEDOES
used on board the
'FORTUNE' & 'TRIANA'; U.S.N.

Fig 1.



DETAILS
of arrangement shewn in Fig 1.

Fig 4.

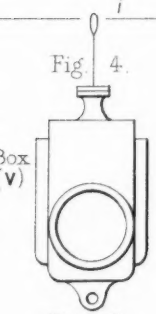
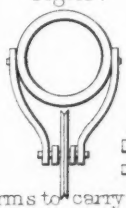
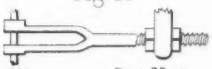


Fig 15.



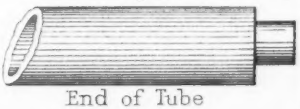
Arms to carry W

Fig 16.



Set Nuts

Fig 17.

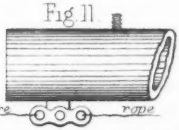


End of Tube

Fig 6.

Section on D.E.

Fig 11.



Draw Link for Rope.

Fig 12.

Fig 13.

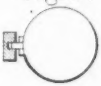
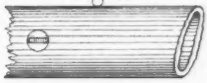
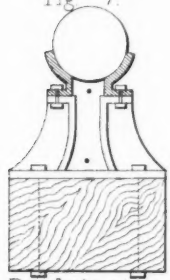


Fig 14.



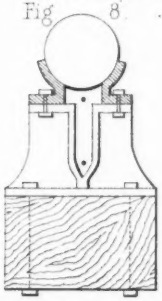
Guiding Rail and Stud

Fig 7.



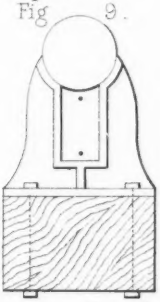
Brackets at *a*
(dots denote position of wire rope)

Fig 8.



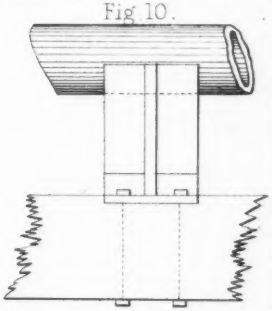
Brackets at *b.b.*

Fig 9.



Brackets at *c.c.c.c.*

Fig 10.



J Jobbins

I am free, gentlemen, to admit that my account of the Austrian Army has been far from complete; yet, if it induce any one of you to enter into closer acquaintance with a body with which our service is knit by the bonds of mutual esteem, my object will have been fully attained. I have now but to express my sincere acknowledgements to you, Sir, for the honour you have done me in presiding here to-day, and to you, gentlemen, for the consideration with which you have been pleased to listen to my narrative.

DESCRIPTION OF THE TORPEDO BOATS "FORTUNE" AND "TRIANA," UNITED STATES' NAVY.

By Lieut. J. Townsend Bucknill, R.E.

These vessels were employed as tugs during the civil war, and were lying at the Washington Navy Yard in January, 1872. One of them, the "Fortune," had then been converted into a torpedo boat, and was in commission, but the other was undergoing a refit and alteration, so as to convert her into a similar torpedo vessel.

The navy yards of the United States are all open to the public, and, although I could gain very little information respecting these torpedo boats, I was enabled, by a hurried inspection of the "Triana," to take the following details, the *approximate* accuracy of which can be relied upon:

Size, 170 to 180 tons.
Length over all, 130 feet.
Beam, about 25 feet.
Draught, from 8 to 9 feet.
Engine 125 H.P. single vertical cylinder, direct acting.
Speed, 7 knots.
Burns 11 tons of coal in 24 hours.
Carries 95 tons.
Rig, fore and aft schooner, pole-masted.
Spread of canvas unknown, but small.
Freeboard, about 5 feet.
Bulwarks, about 3 feet.
Top-hamper, as usual, with American tugs.

The deck of the "Triana" had been removed, and she was being strengthened throughout, but more especially in those portions near the bow.

About 4 or 5 feet below the normal water-line, an iron nozzle was fixed in line with the stem or fore-foot by means of two ears, which were riveted to the sides of the vessel. This nozzle, which projected in front of the stem, was bored out to form a hole a little over 10 inches in diameter, and in the top of the nozzle a large U-shaped aperture was made, into which an iron door could swing when the torpedo was pushed from the interior of the vessel, Figs. (5), (2), (3). This door, in its normal

position, hung by its own weight vertically across the opening, which led into the interior of the vessel by a large brass pipe (10 inches diameter internally) that was attached to the inner side of the nozzle. This pipe, as well as the nozzle, had an inclination upwards towards the stern of about 1 in 6, or 1 in 5, and at a distance of, apparently, some 7 or 8 feet from the stem, the pipe terminated in a flange by which it was attached by screw bolts to a valve box, as shown in figs. (4), (1), containing a valve to be worked by hand. To the inner side of the valve-box another brass pipe was attached by screw bolts, and the pipe was only cylindrical for a distance of 12 or 14 inches, after which the upper half was entirely cut away, see fig. (1), and a slot made in the lower portion, as shown in fig. (6). The segmental portions were supported on three brackets (a) (b) (b), figs. (1), (7), (8). The bracket at (a) was made in two separate pieces, so as to give room for the motion of a wheel (w) (12″ diameter), grooved to carry a $1\frac{1}{2}$″ wire rope. The brackets (b) (b) were provided with a deep central slot, so that the wire rope could work through them, see fig. (8). Behind this arrangement were four larger cast-iron brackets, placed at central intervals of about 4 or 5 feet. Upon these, and in the brass tube before-mentioned, see figs. (1), (9), (10), slid the torpedo outrigger, which consisted of a cast-iron tube some 23 feet long, $7\frac{3}{4}$″ to 8″ internal diameter left rough, and having an external diameter of 10″, obtained by accurate turning in a lathe. This tube weighs about one ton. The outer end that is projected in front of the vessel and carries the torpedo was reduced for a length of about one foot, to a diameter of 8″ or 9″, and was cast solid for 5″ or 6″ at the extremity, and a small hole, about $\frac{3}{4}$″ diameter, was bored centrally, through which the electric wires for the firing arrangement were to be led. The tube was to be run in and out by the wire rope before-mentioned. The rope was in two pieces, and the ends of each attached to a link that keyed to two small ears cast on the bottom of the tube at its inner extremity, figs. (11), (12). The remainder of each rope was coiled on the right and left side respectively of a grooved drum (9 grooves) about 20″ diameter; thus, when one rope was coiled in, the other was slacked out, and *vice versâ*. The drum was carried on suitable brackets fixed to the end of the wooden beam, and was turned by a cog-wheel of like diameter (72 cogs) gearing into a smaller wheel (24 cogs) driven by two handles worked by men standing on either side of the beam. On one side of the drum was fixed a pawl and ratchet. To the inner end of the tube an iron guide $\frac{1}{2}$″ × $1\frac{1}{2}$″ was studded; this engaged in a groove $\frac{1}{2}$″ × $\frac{1}{2}$″ cut in the side of a rail bolted to the brackets and brass piece, see figs. (13), (14), (1), and the tube was thus prevented from turning as it was run in and out.

About 16″ from the inner end of the tube, a 1″ screw plug was fixed in the top, it projected about $2\frac{1}{2}$ or 3 inches; its use I could not discover. See fig. (11).

Should the wire rope slacken by stretching it could be taughtened up by the arrangement shown in figs. (1), (15), (16). The axle of the wheel (w) was suspended by two hanging arms pivoted on the brass pipe just inside the valve box, and a forked arm engaged the axle

inside these arms. This forked arm terminated in a $\frac{3}{4}''$ rod threaded at its extremity to receive two nuts. The rod passed through a lug cast on the bottom of the valve box, and by altering the set nuts on either side of this lug, the wire rope could be taughtened up or slacked off as required.

I was informed that the torpedo employed was of cast iron, about 4 feet long and 10″ external diameter, and that the charge was contained in an internal copper cylinder. Also, that the torpedo case was attached to the end of the tube by an iron ring fitting on the reduced part of the tube and over the inner end of the case. This ring is destroyed by the explosion of the torpedo, but the tube remains uninjured, the charge being limited to 100 or 120 lbs. of "cannon" gunpowder. I was informed by a high authority, that it was possible to load, run out, fire, and run in, in from three to four minutes, and that the arrangement gave the greatest satisfaction.

In the "Triana" class of torpedo boats, a bulkhead was placed about 42 feet from the bow; behind this, was stowed the coal, and then came another bulkhead, 20 feet behind the first. A powerful steam bilge pump was fixed in the forecastle as an additional precaution. Portions of the engine and boiler were above the water-line and much exposed to shot. The steam was super-heated in a dome surrounding the funnel, at least 10 feet above the deck. To a certain extent these vessels are experimental only, but several vessels (number unknown) of the United States' Navy, ostensibly tug and despatch boats, are in reality torpedo-boats fitted up on the tubular principle described, or on some modification of it. In some, the tube is thrust out by a screw worked by steam power, but the arrangement described was preferred as being the simplest and best.

It is, I think, evident that the Americans have in this apparatus sought as much as possible to minimize the mechanical intricacies, to a certain extent inherent in this class of torpedo, and if the information I received be correct—viz., that several vessels are armed in this manner, it would appear that the Americans are thoroughly satisfied with the arrangement.

One of the first considerations obtained by investigating this apparatus, is that the experiments of a foreign Power have disclosed the fact that it is possible to fire a charge of 100 or 120 lbs. of Mammoth powder or "cannon" powder at the end of a cast-iron tube, of the dimensions given, *without damaging that tube*. Doubtless a very small charge of dynamite, dualin, compressed gun-cotton, or nitroglycerine, would, if detonated in the same position, utterly destroy the cast-iron tube. This fact being digested, the next consideration and question that arises is, whether 100 lbs. of common gunpowder exploded 7 or 8 feet below the surface, and in contact with the outer skin of an ironclad will cause great damage to such a vessel? Another question suggests itself. Could not a similar apparatus be placed inside the stem of our existing ironclads? If so, would not the ramming power of such a vessel be enormously enhanced? But the Americans do not seem as yet to have applied this plan of working a torpedo from the interior of a vessel to any of their frigates, corvettes, or other cruisers; and

I was unable to discover what apparatus they intended to fit or board the three new torpedo-vessels they had commenced the year before last.

The following are some of the advantages obtained by the employment of the tubular arrangement for outrigging-torpedoes that has been described in the foregoing paper:

1. Ease of fixing and working the torpedoes from a position of comparative safety.

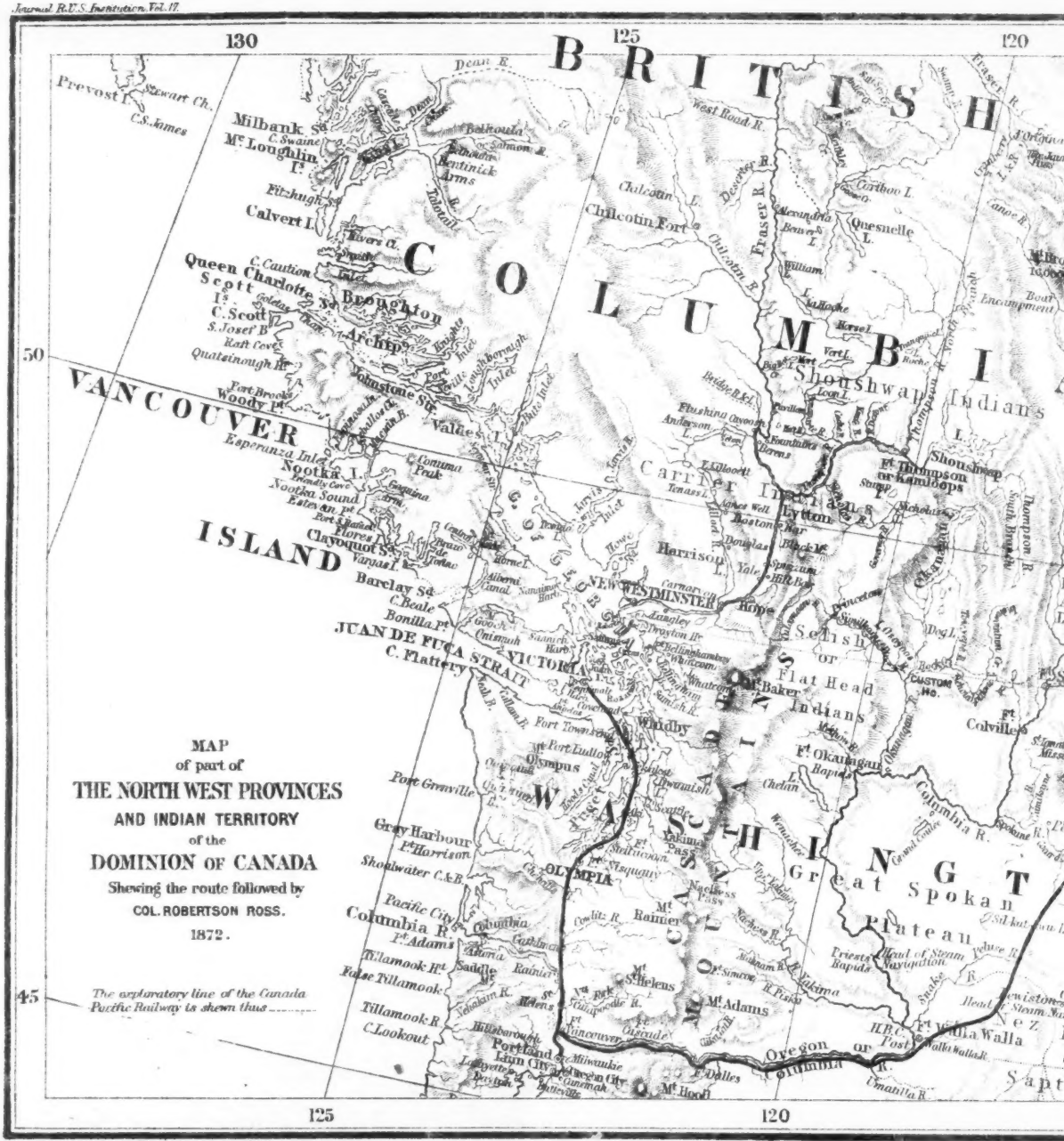
2. Quickness of the operation of re-fixing, booming out, &c.

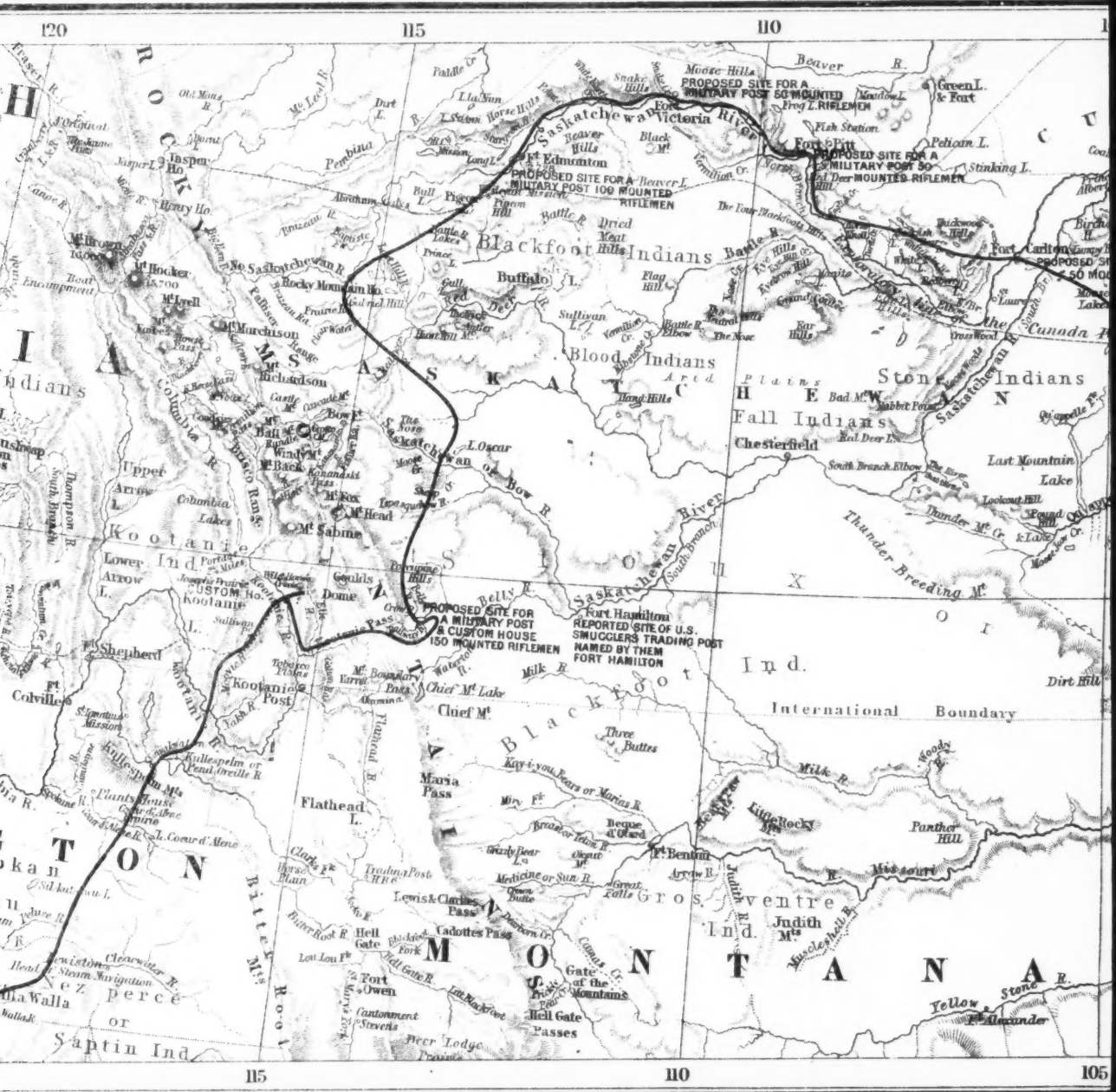
3. Vessel not impeded, or her speed lessened by the apparatus, the tube not being thrust out until just before it is intended to use it.

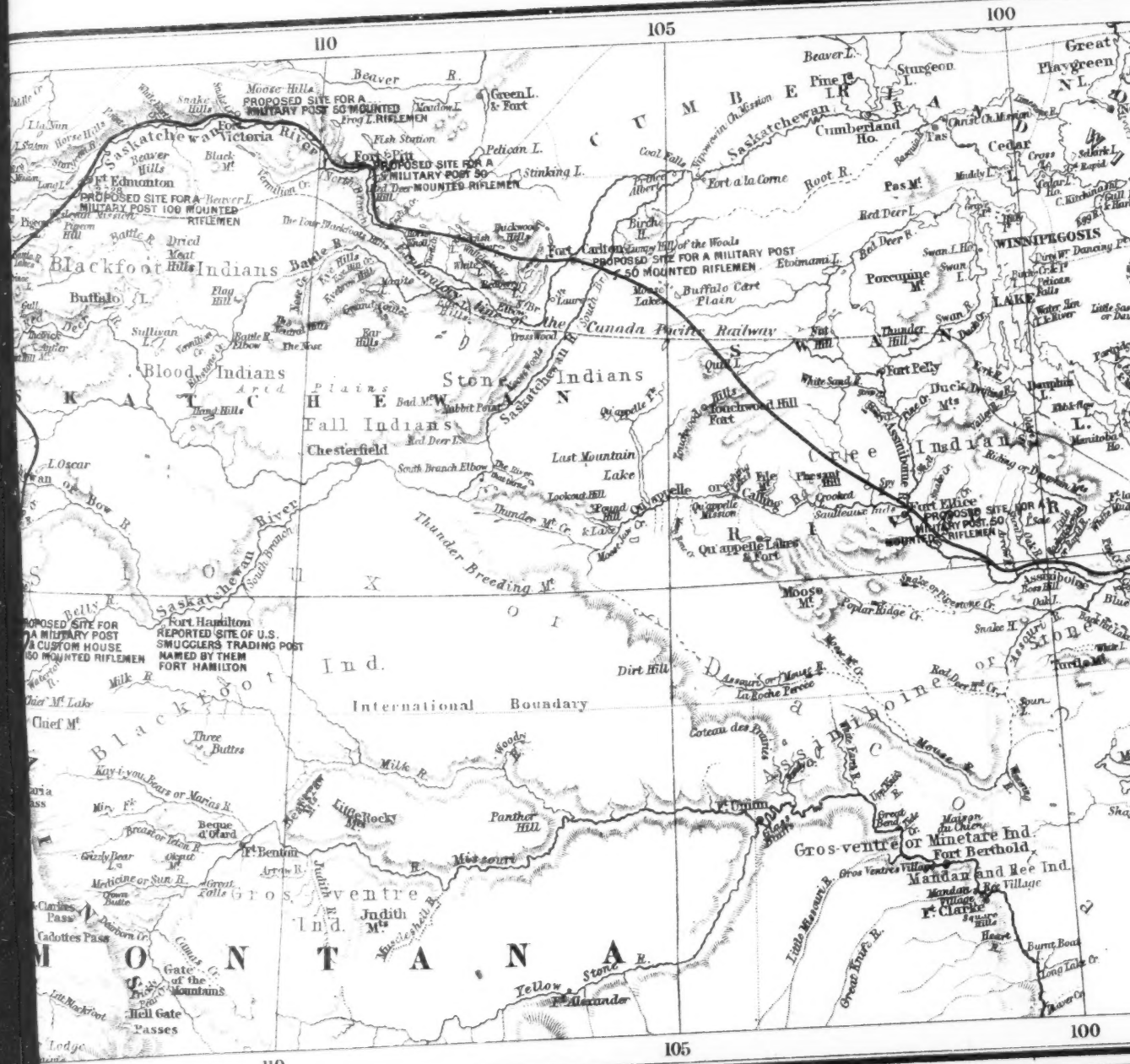
4. Everything out of sight of the enemy, and the vessel's true character thereby concealed.

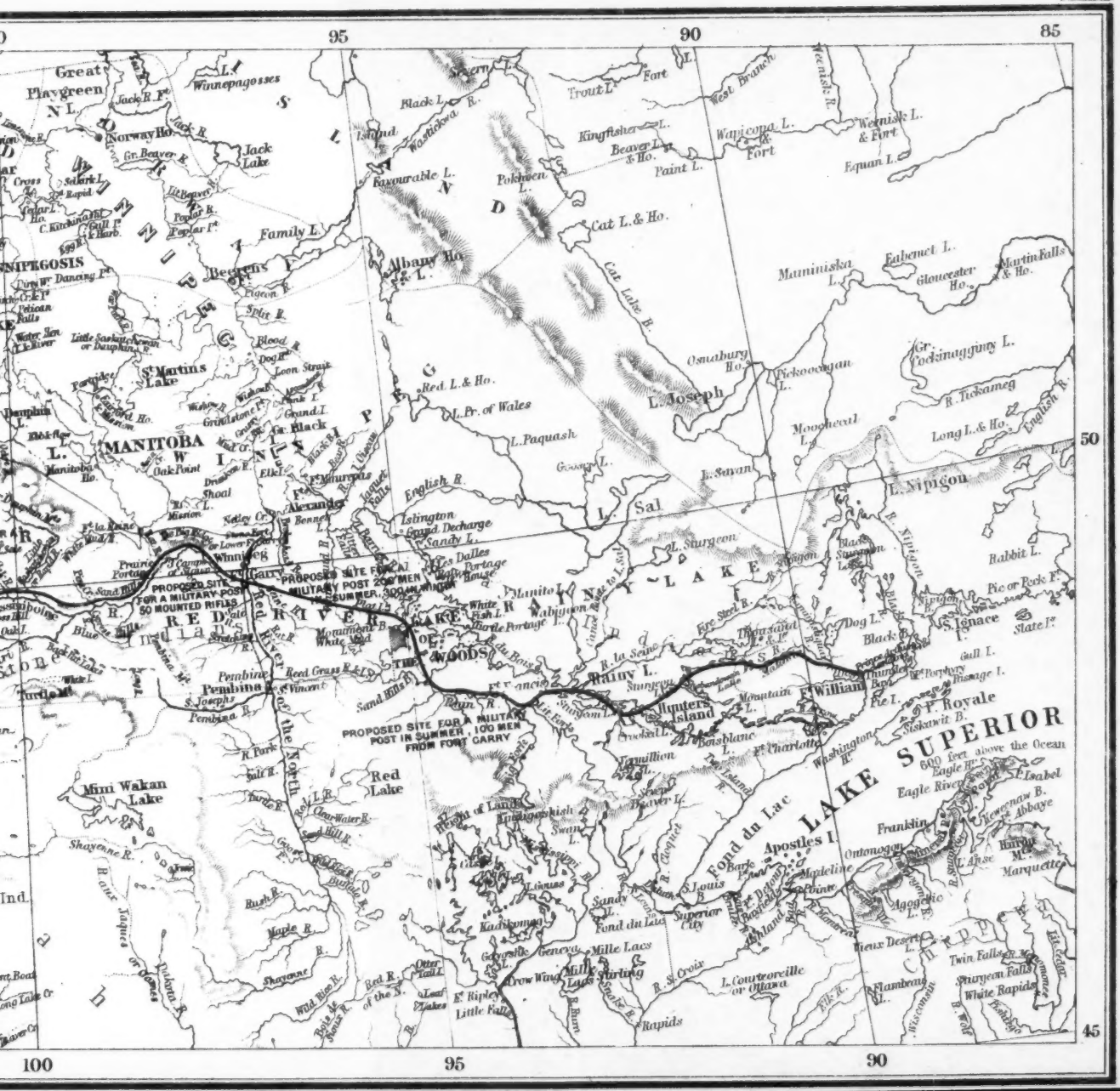
5. By the use of the electric, in place of the chemical fuze, danger to friendly vessels is minimized, and accidental explosions from the torpedo striking against any snag or other impediment, prevented. Moreover, the explosion of the torpedo when in actual contact with the enemy's vessel is ensured and the chance of a failure, such as Captain Davidson experienced when he rammed the "Minnesota" with the Confederate torpedo boat "Squib," and which he attributed to the slowness of action of the chemical non-electric fuze allowing the "Squib," to recoil a short distance before the torpedo exploded, is by the use of the electric fuze guarded against; for it is easy to arrange the electrical portion of the apparatus so that the torpedo can be fired either by judgment or by contact, the former being only resorted to when the contact-arrangement fails to perform its functions. I was unable to discover what the electrical arrangements used by the Americans on board the "Triana" class of torpedo vessels, actually were.

In conclusion I would beg to point out that the Americans seem to have paid more attention to the torpedo-apparatus itself than to its protection from an enemy's shot. This consideration has been carefully thought out elsewhere, and we have only to combine in the same craft the tubular arrangements described in the foregoing paper, with the almost shot-proof deck and noiseless engines of other existing and known types of torpedo vessels to obtain a thoroughly trustworthy and efficient class of vessels for use on our coast defences.


130
125
120
50
45
BRITISH
COLUMBIA
VANCOUVER
ISLAND
Prevost I.
Stewart Ch.
C. St James
Milbank Sd.
C. Swaine
Mc Loughlin P.
Fitzhugh Sd.
Calvert I.
Queen Charlotte Sd.
Scott Is.
C. Scott
Broughton Archip.
C. Caution
Quatsinough Rk.
Fort Brooks
Woody Pt.
Johnstone Str.
Esperanza Inlet
Nootka I.
Nootka Sound
Clayoquot Sd.
Barclay Sd.
C. Beale
Bonilla Pt.
JUAN DE FUCA STRAIT
C. Flattery
Dean R.
Carpenters Dam
Bentinck Arms
Salmon R.
Fraser R.
West Road R.
Chilcotin L.
Chilcotin Fort
Quesnelle L.
Alexandria
Soda Creek
Williams L.
Horsefly
Shoushwap Indians
Ft. Thompson or Kamloops
Lytton
Boston Bar
Harrison L.
Douglas
Yale
Hope
NEW WESTMINSTER
Langley
Victoria
Esquimalt
Sooke
Whidby I.
Port Townsend
Port Ludlow
Olympus
Port Discovery
Pt. Grenville
Gray Harbour
Pt. Harrison
Shoalwater C.
OLYMPIA
Pacific City
Columbia R.
Pt. Adams
Tillamook Hd.
False Tillamook
Tillamook R.
C. Lookout
Saddle Mt.
Rainier
Mt. St. Helens
Mt. Adams
Portland
Lewis R.
Columbia R.
Oregon
Ft. Dalles
Mt. Hood
Umatilla R.
Ft. Walla Walla
Flathead Indians
Ft. Okanagan
Colville
Columbia R.
Great Spokan Plateau
Priests Rapids
Head of Steam Navigation
Lewiston
Steam Nav.
MAP
of part of
THE NORTH WEST PROVINCES
AND INDIAN TERRITORY
of the
DOMINION OF CANADA
Shewing the route followed by
COL. ROBERTSON ROSS.
1872.
The exploratory line of the Canada Pacific Railway is shewn thus
English Statute Miles
50 40 30 20 10 0 50 100 150


120
115
110
105
PROPOSED SITE FOR A MILITARY POST 50 MOUNTED RIFLEMEN
PROPOSED SITE FOR A MILITARY POST 100 MOUNTED RIFLEMEN
PROPOSED SITE FOR A MILITARY POST 50 MOUNTED RIFLEMEN
PROPOSED SITE FOR A MILITARY POST & CUSTOM HOUSE 150 MOUNTED RIFLEMEN
Fort Hamilton REPORTED SITE OF U.S. SMUGGLERS TRADING POST NAMED BY THEM FORT HAMILTON
International Boundary
Saskatchewan River
Victoria
Edmonton
Pitt
Carlton
Battle R.
Blackfoot Indians
Blood Indians
Stone Indians
Fall Indians
Chesterfield
Buffalo L.
Rocky Mountain Ho.
Jasper Ho.
Henry Ho.
Boat Encampment
Mt Brown
Mt Hooker
Mt Lyell
Mt Murchison
Mt Richardson
Mt Bowl
Mt Ball
Mt Back
Mt Fox
Mt Head
Mt Sabine
Columbia R.
Columbia Lakes
Upper Arrow L.
Lower Arrow L.
Kootanie
Kootanie Ho.
Kootanie Post
Shepherd
Colville
Flathead L.
Maria Pass
Chief Mt
Dome
Goulds
Bow R.
Oscar
Bow Pass
Kananaskis Pass
Vermilion Hills
Bells R.
Milk R.
Three Buttes
Kay-i-you Pears or Marias R.
Bad Mt
Rabbit Point
Red Deer R.
Last Mountain Lake
Lookout Hill
Pound Hill
Thunder Mt
Thunder Breeding Mt.
Dirt Hill
Woody Mt
Little Rocky Mts
Panther Hill
Missouri R.
Fort Benton
Arrow R.
Judith Mt
Judith R.
Musselshell R.
Great Falls
Medicine or Sun R.
Grizzly Bear Lodge
Beaver Head
Lewis & Clarke Pass
Cadottes Pass
Hell Gate
Hell Gate Fork
Hell Gate R.
Lou Lou Fk
Fort Owen
Gate of the Mountains
Hell Gate Passes
Bitter Root R.
Bitter Root Mts
Clearwater R.
Lewiston
Steam Navigation
Nez Perce
or
Saptin Ind.
Walla Walla
Yellow Stone R.
Alexander
Green L. & Fort
Pelican L.
Stinking L.
Moose Hills
Snake Hills
Paddle Cr
Beaver R.
Flag Hill
Sullivan L.
Gull L.
Dried Meat Hills
Eye Hills
Ear Hills
Long Hills
Chippewa Pt
Qu'Appelle R.
Cross Wood
Canada
Ind.
Plains
Columbia Mts
Rocky Mts
Kootanie Ind.
Flathead Ind.
Pend Oreille R.
Spokane R.
Coeur d'Alene
Snake R.
Tobacco Plains
Kullespelm or Pend Oreille R
Plants House or Coeur d'Alene Mission
Stamtuse Mission
Jocko R.
Flathead R.
Clark's Fk
Trading Post HBC
Horse Plain
Deer Lodge Prairie
Cantonment Stevens
Lou Lou Fk
Blackfoot Fork
Bitter Root R.
Deer Lodge R.
Flint Cr.
Timber Cr.
Dearborn R.
Canoe Cr.
Gate of the Mountains
Hell Gate Passes
Missoula R.
Clark's Fk
Yellow Stone R.
Alexander


110
105
100
Beaver R.
Moose Hills
PROPOSED SITE FOR A MILITARY POST 50 MOUNTED RIFLEMEN
Green L. & Fort
Saskatchewan
Victoria River
Fort Pitt
PROPOSED SITE FOR A MILITARY POST 50 MOUNTED RIFLEMEN
Pelican L.
Stinking L.
Fort Edmonton
PROPOSED SITE FOR A MILITARY POST 100 MOUNTED RIFLEMEN
Blackfoot Indians
Battle R.
Buffalo L.
Fort Carlton
PROPOSED SITE FOR A MILITARY POST 50 MOUNTED RIFLEMEN
Canada Pacific Railway
Blood Indians
Stone Indians
Fall Indians
Chesterfield
Last Mountain Lake
Qu'appelle
Fort Ellice
PROPOSED SITE FOR A MILITARY POST 50 MOUNTED RIFLEMEN
Qu'appelle Lakes & Fort
Thunder Breeding Mt.
Fort Hamilton
REPORTED SITE OF U.S. SMUGGLERS TRADING POST NAMED BY THEM FORT HAMILTON
PROPOSED SITE FOR A MILITARY POST & CUSTOM HOUSE 150 MOUNTED RIFLEMEN
International Boundary
Dirt Hill
Chief Mt.
Three Buttes
Milk R.
Beque d'Otard
Ft. Benton
Little Rocky Mts.
Panther Hill
Missouri R.
Gros Ventre Ind.
Judith Mts.
Judith R.
Gates of the Mountains
Hell Gate Passes
Cadottes Pass
Dearborn R.
Ft. Alexander
Yellow Stone R.
Ft. Union
Gros-ventre or Minetare Ind.
Fort Berthold
Mandan and Ree Ind.
Mandan Village
Ft. Clarke
Heart R.
Burnt Boat
Long Lake Cr.
Great Knife R.
Little Missouri R.
Assiniboine
Assiniboine R.
Duck Mts.
Porcupine Mt.
Swan R.
Swan L.
WINNIPEGOSIS
LAKE
Cumberland Ho.
Pas Mt.
Red Deer R.
Red Deer L.
Fort Pelly
Touchwood Hills
Touchwood Hill Fort
Qu'appelle R.
Qu'appelle Valley
Moose Mt.
Poplar Ridge Cr.
Eagle or Pipestone Cr.
Snake Hills
Turtle Mt.
Moose Mt. Cr.
Red Deer Mt. Cr.
Souris R.
Coteau des Prairies
Deadwood or Maus R.
La Roche Percee
Pipestone Creek
Boggy Hill
Maison du Chien
Great Bend
Gros Ventres Village
Little Missouri R.
Muddy L.
Cedar L.
Cross L.
Sclark L.
Rapid R.
Birch R.
Carrot R.
Root R.
Beaver L.
Sturgeon L.
Pine R.
Great Playgreen L.
Saskatchewan
Cumberland
Indian
Cree
Plains
Arid
Bad Mt.
Rabbit Foot
Red Deer R.
Long Hills
Sullivan L.
Flag Hill
Dried Meat Hills
Battle R.
Elbow
The Nose
Five Hills
Eagle Hill
Ground Hog
Maple
Whitemud R.
Elbow R.
Bow R.
Oscar L.
Bow R.
Milk R.
Bells R.
Saskatchewan
South Branch
Lookout Hill
Round Hill
Thunder Mt. Cr.
Moose Jaw Cr.
Pheasant Hill
Calling
Crooked
Saulteaux Hills
Touchwood Hills
Fort
Qu'appelle Mission
Qu'appelle Valley
Assiniboine
Boss Hill
Oak L.
Eagle or Pipestone Cr.
Moose Mt.
Poplar Ridge Cr.
Snake Hills
Turtle Mt.
Souris R.
Red Deer Mt. Cr.
Coteau des Prairies
Deadwood or Maus R.
La Roche Percee
Pipestone Creek
Boggy Hill
Maison du Chien
Great Bend
Gros Ventres Village
Little Missouri R.
Muddy L.
Cedar L.
Cross L.
Sclark L.
Rapid R.
Birch R.
Carrot R.
Root R.
Beaver L.
Sturgeon L.
Pine R.
Great Playgreen L.
Saskatchewan
Cumberland
Indian
Cree
Plains
Arid
Bad Mt.
Rabbit Foot
Red Deer R.
Long Hills
Sullivan L.
Flag Hill
Dried Meat Hills
Battle R.
Elbow
The Nose
Five Hills
Eagle Hill
Ground Hog
Maple
Whitemud R.
Elbow R.
Bow R.
Oscar L.
Bow R.
Milk R.
Bells R.
Saskatchewan
South Branch
Lookout Hill
Round Hill
Thunder Mt. Cr.
Moose Jaw Cr.
Pheasant Hill
Calling
Crooked
Saulteaux Hills
Touchwood Hills
Fort
Qu'appelle Mission
Qu'appelle Valley
Assiniboine
Boss Hill
Oak L.


95
90
85
50
45
100
95
90
Great Playgreen L.
Winnepagosses L.
Norway Ho.
Jack Lake
Jack R.
Gr. Beaver R.
Lit. Beaver R.
Poplar R.
Poplar Pt.
Family L.
Favourable L.
Albany Ho.
Beggins L.
Egeon R.
Split R.
Blood R.
Dog R.
Loon Strait
St. Martins Lake
Grindstone Pt.
Grand I.
Black R.
MANITOBA L.
Manitoba Ho.
Oak Point
Shoal L.
Ft. Alexander
Bonnet L.
Ft. la Reine
Portage la Prairie
Ft. Ellice
Ft. Pembina
Pembina Mt.
Turtle Mt.
Pembina R.
St. Joseph
St. Vincent
Reed Grass R. & L.
Sand Hills
Rain R.
Mud R.
Red R. of the North
Red Lake
Mini Wakan Lake
Shayenne R.
Maple R.
Rush R.
Wild Rice R.
Otter Tail L.
Leaf Lakes
Ft. Ripley
Little Falls
Rapids
Black L.
Kaskitowa R.
Island L.
Favourable L.
Poskwen L.
Trout L.
Fort
West Branch
Weenisk R.
Kingfisher L.
Beaver L. & Ho.
Paint L.
Wapicopa L. & Fort
Weenisk L. & Fort
Equan L.
Cat L. & Ho.
Cat Lake R.
Albanet L.
Muminiska L.
Gloucester Ho.
Martin Falls & Ho.
Osnaburg Ho.
Pickwickyan L.
L. Joseph
Gr. Cockinaggiggy L.
R. Ticksameg
Moocheeal L.
Long L. & Ho.
English R.
Red L. & Ho.
L. Pr. of Wales
L. Paquash
Gooseg L.
L. Savan
L. Nipigon
L. Sal
Estington
Grand Decharge
Sandy L.
L. Sturgeon
Rabbit L.
Pic or Rock Ft.
St. Ignace I.
Slate I.
Dog L.
Gull L.
Porphyry I.
Pt. William
Pic R.
Pt. Royale
Siskawit B.
Isle Royale
Eagle Harbour
Eagle River
Copper Harbour
Ft. Isabel
Keweenaw B.
Keweenaw Abbaye
Franklin
Ontonagon
L. Anse
Marquette
Apostles I.
Bad R.
Portage
Madeline
Pt. Detour
Bayfield
Pt. Pointe
Agogebic L.
Lieux Desert
Twin Falls
Sturgeon Falls
White Rapids
Flambeau L.
Wisconsin R.
Chippewa R.
Eau Claire R.
Fond du Lac
Superior City
St. Louis R.
Sandy L.
Fond du Lac
Kadishonagog
Georgeville
Geneva
Mille Lacs
Mille Lacs Sterling
Crow Wing
R. St. Croix
L. Courtorcille or Ottawa
Elk R.
Snake R.
R. Burn
Wild Rice R.
Red R. of the N.
Pokanna R.
Shayenne R.
Baie Jaques or Jones
Ind.
Boat Lake Cr.
Beaver Cr.
Long Lake Cr.
Rat R.
Turtle R.
Sault R.
Park R.
Cour Water R.
Sand Hill R.
Grand Marais
Pembina Mt.
Turtle Mt.
Ft. Garry
Winnipeg
Ft. la Reine
Portage la Prairie
Ft. Ellice
Ft. Alexander
Ft. Minnipas
Ft. Pembina
Ft. Black
Ft. Ripley
Ft. William
Ft. Charlotte
Ft. Isabel
Ft. Abbaye
Ft. Royale
Ft. Detour
Ft. Pointe
Ft. Superior
Ft. Louis
Ft. Ripley
Ft. Burn
Ft. Cedar
Ft. Snake
Ft. Elk
Ft. Flambeau
Ft. Wisconsin
Ft. Chippewa
Ft. Eau Claire
Ft. Rapids
Ft. Falls
Ft. Sturgeon Falls
Ft. White Rapids
Ft. Twin Falls
Ft. Lieux Desert
Ft. Agogebic L.
Ft. Marquette
Ft. Anse
Ft. Ontonagon
Ft. Franklin
Ft. Keweenaw Abbaye
Ft. Keweenaw B.
Ft. Isabel
Ft. Eagle River
Ft. Eagle Harbour
Ft. Siskawit B.
Ft. Isle Royale
Ft. Pt. Royale
Ft. Pic R.
Ft. Pt. William
Ft. Porphyry I.
Ft. Gull I.
Ft. Slate I.
Ft. St. Ignace I.
Ft. Pic or Rock Ft.
Ft. Rabbit L.
Ft. L. Nipigon
Ft. L. Sturgeon
Ft. L. Sal
Ft. Estington
Ft. Grand Decharge
Ft. Sandy L.
Ft. Les Dalles
Ft. Portage
Ft. Water House
Ft. Dog L.
Ft. Black R.
Ft. Steel R.
Ft. Thunder Bay
Ft. Mountain
Ft. Bonsblanc L.
Ft. Hunters Island
Ft. Pie I.
Ft. Washington Hr.
Ft. Island
Ft. Vermillion L.
Ft. Crooked L.
Ft. Sturgeon L.
Ft. Stanley
Ft. Mountain
Ft. Rainy L.
Ft. Rainy R.
Ft. Nequabiguon R.
Ft. Nequabiguon L.
Ft. White Fish L.
Ft. White Fish R.
Ft. Portage L.
Ft. Monument R.
Ft. White Mud R.
Ft. Steel R.
Ft. Dauphin L.
Ft. Dauphin R.
Ft. Water Hen L. & R.
Ft. Little Saskatchewan or Dauphin R.
Ft. Pelican Falls
Ft. Two Mr. Danang Pts.
Ft. Cross L.
Ft. Rapid
Ft. Solark L.
Ft. Ho.
Ft. Cedar L.
Ft. Kinchinahat
Ft. Gull Pt.
Ft. Harb.
Ft. Big R.
Ft. Cedar R.
Ft. Ind.
Ft. Boat
Ft. Cr.
Ft. Lake Cr.
Ft. Beaver Cr.
Ft. Long Lake Cr.
Ft. Rat R.
Ft. Turtle R.
Ft. Sault R.
Ft. Park R.
Ft. Cour Water R.
Ft. Sand Hill R.
Ft. Grand Marais
Ft. Pembina Mt.
Ft. Turtle Mt.
Ft. Garry
Ft. Winnipeg
Ft. la Reine
Ft. Portage la Prairie
Ft. Ellice
Ft. Alexander
Ft. Minnipas
Ft. Pembina
Ft. Black
Ft. Ripley
Ft. William
Ft. Charlotte
Ft. Isabel
Ft. Abbaye
Ft. Royale
Ft. Detour
Ft. Pointe
Ft. Superior
Ft. Louis
Ft. Ripley
Ft. Burn
Ft. Cedar
Ft. Snake
Ft. Elk
Ft. Flambeau
Ft. Wisconsin
Ft. Chippewa
Ft. Eau Claire
Ft. Rapids
Ft. Falls
Ft. Sturgeon Falls
Ft. White Rapids
Ft. Twin Falls
Ft. Lieux Desert
Ft. Agogebic L.
Ft. Marquette
Ft. Anse
Ft. Ontonagon
Ft. Franklin
Ft. Keweenaw Abbaye
Ft. Keweenaw B.
Ft. Isabel
Ft. Eagle River
Ft. Eagle Harbour
Ft. Siskawit B.
Ft. Isle Royale
Ft. Pt. Royale
Ft. Pic R.
Ft. Pt. William
Ft. Porphyry I.
Ft. Gull I.
Ft. Slate I.
Ft. St. Ignace I.
Ft. Pic or Rock Ft.
Ft. Rabbit L.
Ft. L. Nipigon
Ft. L. Sturgeon
Ft. L. Sal
Ft. Estington
Ft. Grand Decharge
Ft. Sandy L.
Ft. Les Dalles
Ft. Portage
Ft. Water House
Ft. Dog L.
Ft. Black R.
Ft. Steel R.
Ft. Thunder Bay
Ft. Mountain
Ft. Bonsblanc L.
Ft. Hunters Island
Ft. Pie I.
Ft. Washington Hr.
Ft. Island
Ft. Vermillion L.
Ft. Crooked L.
Ft. Sturgeon L.
Ft. Stanley
Ft. Mountain
Ft. Rainy L.
Ft. Rainy R.
Ft. Nequabiguon R.
Ft. Nequabiguon L.
Ft. White Fish L.
Ft. White Fish R.
Ft. Portage L.
Ft. Monument R.
Ft. White Mud R.
Ft. Steel R.
Ft. Dauphin L.
Ft. Dauphin R.
Ft. Water Hen L. & R.
Ft. Little Saskatchewan or Dauphin R.
Ft. Pelican Falls
Ft. Two Mr. Danang Pts.
Ft. Cross L.
Ft. Rapid
Ft. Solark L.
Ft. Ho.
Ft. Cedar L.
Ft. Kinchinahat
Ft. Gull Pt.
Ft. Harb.
Ft. Big R.
Ft. Cedar R.
Ft. Ind.
Ft. Boat
Ft. Cr.
Ft. Lake Cr.
Ft. Beaver Cr.
Ft. Long Lake Cr.
Ft. Rat R.
Ft. Turtle R.
Ft. Sault R.
Ft. Park R.
Ft. Cour Water R.
Ft. Sand Hill R.
Ft. Grand Marais
Ft. Pembina Mt.
Ft. Turtle Mt.
Ft. Garry
Ft. Winnipeg
PROPOSED SITE FOR A MILITARY POST FOR 50 MOUNTED RIFLES
PROPOSED SITE FOR A MILITARY POST 200 MEN SUMMER, 300 MEN WINTER
PROPOSED SITE FOR A MILITARY POST IN SUMMER, 100 MEN FROM FORT GARRY
RED RIVER SETTLEMENT
LAKE OF THE WOODS
LAKE SUPERIOR
600 feet above the Ocean
Height of Land
Kimiwapiskish
Swan
Beaver L.
Sandy L.
Fond du Lac
Kadishonagog
Georgeville
Geneva
Mille Lacs
Mille Lacs Sterling
Crow Wing
R. St. Croix
L. Courtorcille or Ottawa
Elk R.
Snake R.
R. Burn
Wild Rice R.
Red R. of the N.
Pokanna R.
Shayenne R.
Baie Jaques or Jones
Ind.
Boat Lake Cr.
Beaver Cr.
Long Lake Cr.
Rat R.
Turtle R.
Sault R.
Park R.
Cour Water R.
Sand Hill R.
Grand Marais
Pembina Mt.
Turtle Mt.
Ft. Garry
Winnipeg
Ft. la Reine
Portage la Prairie
Ft. Ellice
Ft. Alexander
Ft. Minnipas
Ft. Pembina
Ft. Black
Ft. Ripley
Ft. William
Ft. Charlotte
Ft. Isabel
Ft. Abbaye
Ft. Royale
Ft. Detour
Ft. Pointe
Ft. Superior
Ft. Louis
Ft. Ripley
Ft. Burn
Ft. Cedar
Ft. Snake
Ft. Elk
Ft. Flambeau
Ft. Wisconsin
Ft. Chippewa
Ft. Eau Claire
Ft. Rapids
Ft. Falls
Ft. Sturgeon Falls
Ft. White Rapids
Ft. Twin Falls
Ft. Lieux Desert
Ft. Agogebic L.
Ft. Marquette
Ft. Anse
Ft. Ontonagon
Ft. Franklin
Ft. Keweenaw Abbaye
Ft. Keweenaw B.
Ft. Isabel
Ft. Eagle River
Ft. Eagle Harbour
Ft. Siskawit B.
Ft. Isle Royale
Ft. Pt. Royale
Ft. Pic R.
Ft. Pt. William
Ft. Porphyry I.
Ft. Gull I.
Ft. Slate I.
Ft. St. Ignace I.
Ft. Pic or Rock Ft.
Ft. Rabbit L.
Ft. L. Nipigon
Ft. L. Sturgeon
Ft. L. Sal
Ft. Estington
Ft. Grand Decharge
Ft. Sandy L.
Ft. Les Dalles
Ft. Portage
Ft. Water House
Ft. Dog L.
Ft. Black R.
Ft. Steel R.
Ft. Thunder Bay
Ft. Mountain
Ft. Bonsblanc L.
Ft. Hunters Island
Ft. Pie I.
Ft. Washington Hr.
Ft. Island
Ft. Vermillion L.
Ft. Crooked L.
Ft. Sturgeon L.
Ft. Stanley
Ft. Mountain
Ft. Rainy L.
Ft. Rainy R.
Ft. Nequabiguon R.
Ft. Nequabiguon L.
Ft. White Fish L.
Ft. White Fish R.
Ft. Portage L.
Ft. Monument R.
Ft. White Mud R.
Ft. Steel R.
Ft. Dauphin L.
Ft. Dauphin R.
Ft. Water Hen L. & R.
Ft. Little Saskatchewan or Dauphin R.
Ft. Pelican Falls
Ft. Two Mr. Danang Pts.
Ft. Cross L.
Ft. Rapid
Ft. Solark L.
Ft. Ho.
Ft. Cedar L.
Ft. Kinchinahat
Ft. Gull Pt.
Ft. Harb.
Ft. Big R.
Ft. Cedar R.
Ft. Ind.
Ft. Boat
Ft. Cr.
Ft. Lake Cr.
Ft. Beaver Cr.
Ft. Long Lake Cr.
Ft. Rat R.
Ft. Turtle R.
Ft. Sault R.
Ft. Park R.
Ft. Cour Water R.
Ft. Sand Hill R.
Ft. Grand Marais
Ft. Pembina Mt.
Ft. Turtle Mt.
Ft. Garry
Ft. Winnipeg